MOTHER TERESA INSTITUTE OF SCIENCE AND TECHNOLOGY

AUTONOMOUS

B.Tech. in ELECTRONICS AND COMMUNICATION ENGINEERING COURSE STRUCTURE & SYLLABUS

(M24 Regulations)

Applicable from AY 2024-25 Batch

I Year I Semester

S. No.	Course Code	Course Title	L	T	P	Credits
1.	M241AEC101	Matrices and Calculus	3	1	0	4
2.	M241AEC102	Applied Physics	3	1	0	4
3.	M241AEC103	C Programming for Engineers	3	0	0	3
4.	M241AEC104	Engineering Workshop	0	1	3	2.5
5.	M241AEC105	English for Skill Enhancement	2	0	0	2
6.	M241AEC106	Elements of Electronics and Communication Engineering	0	0	2	1
7.	M241AEC107	Applied Physics Laboratory	0	0	3	1.5
8.	M241AEC108	C Programming for Engineers Laboratory	0	0	2	1
9.	M241AEC109	English Language and Communication Skills Laboratory	0	0	2	1
10.	M241AEC110	Environmental Science	3	0	0	0
		Induction Programme				
		Total	**14**	**3**	**12**	**20**

I Year II Semester

S.No.	Course Code	Course Title	L	T	P	Credits
1.	M241AEC201	Ordinary Differential Equations and Vector Calculus	3	1	0	4
2.	M241AEC202	Engineering Chemistry	3	1	0	4
3.	M241AEC203	Computer Aided Engineering Graphics	1	0	4	3
4.	M241AEC204	Basic Electrical Engineering	2	0	0	2
5.	M241AEC205	Electronic Devices and Circuits	2	0	0	2
6.	M241AEC206	Applied Python Programming Laboratory	0	1	2	2
7.	M241AEC207	Engineering Chemistry Laboratory	0	0	2	1
8.	M241AEC208	Basic Electrical Engineering Laboratory	0	0	2	1
9.	M241AEC209	Electronic Devices and Circuits Laboratory	0	0	2	1
		Total	**11**	**3**	**12**	**20**

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II Year I Semester **M24**

S.NO	CourseCode	Title of the Course	L	T	P/D	CH	C
1	M241AEC301	Transform Theory, Numerical Techniques & Complex Variables	3	0	0	3	4
2	M241AEC302	Analog Electronics	3	0	0	3	3
3	M241AEC303	Signals & Systems	3	1	0	4	4
4	M241AEC304	Switching Theory and Logic Design	3	0	0	3	3
5	M241AEC305	Network analysis and Synthesis	3	0	0	3	3
6	M241AEC306	Analog Electronics Laboratory	0	0	2	2	1
7	M241AEC307	Signals & Systems Laboratory	0	0	2	2	1
8	M241AEC308	Digital Logic Design Laboratory	0	0	2	2	1
9	*M241AEC309	Indian Constitution	3	0	0	3	0
		Total					**20**

II Year II Semester **M24**

S.NO	CourseCode	Title of the Course	L	T	P/D	CH	C
1	M241AEC401	Probability Theory & Stochastic Processes	3	0	0	3	4
2	M241AEC402	Linear and Digital Integrated Circuits Applications	3	0	0	3	3
3	M241AEC403	Electromagnetic Waves and Transmission Lines	3	0	0	3	4
4	M241AEC404	Electronic Circuit Analysis	3	0	0	3	3
5	M241AEC405	Analog and Digital Communications	3	0	0	3	3
6	M241AEC406	Linear and Digital Integrated Circuits Applications Laboratory	0	0	2	2	1
7	M241AEC407	Electronic Circuit Analysis Laboratory	0	0	2	2	1
8	M241AEC408	Analog and Digital Communications Laboratory	0	0	2	2	1
9	*M241AEC409	Gender Sensitization Lab	3	0	3	3	0
		Total					**20**

L – Lecture T – Tutorial P – Practical D – Drawing CH – Contact Hours/Week C – Credits

BOARD OF STUDIES MEMBERS

S.No	Name of the Member	Signature	S.No	Name of the Member	Signature
1	Dr M MADHAVI LATHA		5	Dr G UDAYKIRAN BHARGAVA	
2	Dr G N SWAMY		6	Mr B RAVIKUMAR	
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III Year I Semester **M24**

S.NO	CourseCode	Title of the Course	L	T	P/D	CH	C
1	M241AEC501	Microprocessors and Microcontrollers	3	1	0	4	4
2	M241AEC502	IOT Architectures and Protocols	3	0	0	3	3
3	M241AEC503	Control Systems	3	0	0	3	3
4	M241AEC504	Business Economics & Financial Analysis	3	0	0	3	3
	Professional Elective – I						
5	M241AEC505A	Computer Organization & Operating Systems	3	0	0	3	3
	M241AEC505B	Data Communications and Computer Networks					
	M241AEC505C	Electronic Measurements and Instrumentation					
6	M241AEC506	Microprocessors and Microcontrollers Laboratory	0	0	2	2	1
7	M241AEC507	IOT Architectures and Protocols Laboratory	0	0	2	2	1
8	M241AEC508	Advanced English Communication Skills Laboratory	0	0	2	2	1
9	M241AEC509	Python Programming	0	0	3	3	1
10	*M241AEC510	Intellectual Property Rights	3	0	0	3	0
	Total		**18**	**1**	**9**	**28**	**20**

III Year II Semester **M24**

S.NO	CourseCode	Title of the Course	L	T	P/D	CH	C
1	M241AEC601	Antennas and Wave Propagation	3	0	0	3	3
2	M241AEC602	CMOS VLSI Design	3	0	0	3	3
3	M241AEC603	Digital Signal Processing	3	0	0	3	3
	Professional Elective - II						
4	M241AEC604A	Object Oriented Programming through Java	3	0	0	3	3
	M241AEC604B	Mobile Communications and Networks					
	M241AEC604C	Embedded System Design					
5	M241AEC605	**Open Elective – I**	2	0	2	4	3
6	M241AEC606	Digital Signal Processing Laboratory	0	0	2	2	1
7	M241AEC607	CMOS VLSI Design Laboratory	0	0	2	2	1
8	M241AEC608	Advanced Communication Laboratory	0	0	2	2	1
9	M241AEC609	Industry Oriented Mini Project/ Internship	0	0	4	4	2
10	*M241AEC610	Environmental Science	3	0	0	3	0
	Total		**17**	**0**	**12**	**29**	**20**

L – Lecture T – Tutorial P – Practical D – Drawing CH – Contact Hours/Week C – Credits

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IV Year I Semester **M24**

S.NO	CourseCode	Title of the Course	L	T	P/D	CH	C
1	M241AEC701	Microwave and Optical Communications	3	1	0	4	4
	Professional Elective – III						
2	M241AEC702A	Artificial Neural Networks	3	0	0	3	3
	M241AEC702B	Multimedia Database Management Systems					
	M241AEC702C	Digital Image Processing					
	Professional Elective – IV						
3	M241AEC703A	Network Security and Cryptography	3	0	0	3	3
	M241AEC703B	Satellite Communications					
	M241AEC703C	Error Correcting Codes					
4	M241AEC704	**Open Elective – II**	2	0	2	4	3
5	M241AEC705	Professional Practice, Law & Ethics	2	0	0	2	2
6	M241AEC706	Microwave and Optical Communications Laboratory	0	0	4	4	2
7	*M241AEC707	Project Stage – I	0	0	6	6	3
	Total		**13**	**1**	**12**	**26**	**20**

IV Year II Semester **M24**

S.NO	CourseCode	Title of the Course	L	T	P/D	CH	C
	Professional Elective - V						
1	M241AEC801A	Artificial Intelligence	3	0	0	3	3
	M241AEC801B	Biomedical Instrumentation					
	M241AEC801C	Radar Systems					
	Professional Elective - VI						
2	M241AEC802A	System on Chip Architecture	3	0	0	3	3
	M241AEC802B	Machine Learning					
	M241AEC802C	Wireless Sensor Networks					
3	M241AEC803	**Open Elective – III**	3	0	0	3	3
4	M241AEC804	Project Stage – II including Seminar	0	0	22	22	11
	Total		9	**0**	**22**	**31**	**20**

L – Lecture T – Tutorial P – Practical D – Drawing CH – Contact Hours/Week C – Credits

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LIST OF OPEN ELECTIVES OFFERED FOR
M-24 REGULATION
B.TECH., ELECTRONICS AND COMMUNICATION ENGINEERING PROGRAMME

III Yr II Sem Open Elective (OE–I)

DEPARTMENT OF CIVIL ENGINEERING SUBJECTS
1. M241ACE605A- Disaster Preparedness & Planning Management
DEPARTMENT OF CSE SUBJECTS
1. M241ACS605A- Entrepreneurship 2. M241ACS605B- Fundamentals of Management for Engineers 3. M241ACS605C- Cyber Security
DEPARTMENT OF EEE SUBJECTS
1. M241AEE605A- Reliability Engineering 2. M241AEE605B- Renewable Energy Sources
DEPARTMENT OF MECHANICAL ENGINEERING SUBJECTS
1. M241AME605A- Quantitative Analysis for Business Decisions
DEPARTMENT ELECTRONICS AND COMMUNICATION ENGINEERING SUBJECTS
1. M241AEC605A- Fundamentals of IoT 2. M241AEC605B- Mobile Communications 3. M241AEC605C- Embedded System Design

***Note:** Students should take Open Electives from the List of Open Electives Offered by Other Departments/Branches Only.

IV Yr I Sem Open Elective (OE–II)

DEPARTMENT OF CIVIL ENGINEERING SUBJECTS
1. M241ACE704A- Remote Sensing & GIS
DEPARTMENT OF CSE SUBJECTS
1. M241ACS704A- Data Structures 2. M241ACS704B- Artificial Intelligence 3. M241ACS704C- Python Programming 4. M241ACS704D- Java Programming
DEPARTMENT OF EEE SUBJECTS
1. M241AEE704A- Utilization of Electrical Energy 2. M241AEE704B- Electric Drives and Control
DEPARTMENT OF MECHANICAL ENGINEERING SUBJECTS
1. M241AME704A- Basic Mechanical Engineering
DEPARTMENT ELECTRONICS AND COMMUNICATION ENGINEERING SUBJECTS
1. M241AEC704A - Electronic Sensors 2. M241AEC704B - Electronics for Health Care

***Note:** Students should take Open Electives from the List of Open Electives Offered by Other Departments/Branches Only.

IV Yr II Sem Open Elective (OE–III)

DEPARTMENT OF CIVIL ENGINEERING SUBJECTS
1. M241ACE803A- Environmental Impact Assessment
DEPARTMENT OF CSE SUBJECTS
1. M241ACS803A- Machine Learning 2. M241ACS803B- Mobile Application Development 3. M241ACS803C- Scripting Languages 4. M241ACS803D- Database Management Systems
DEPARTMENT OF EEE SUBJECTS
1. M241AEE803A- Basics of Power Plant Engineering 2. M241AEE803B- Energy Sources and Applications
DEPARTMENT OF MECHANICAL ENGINEERING SUBJECTS
1. M241AME803A- Non-Conventional Sources of energy
DEPARTMENT ELECTRONICS AND COMMUNICATION ENGINEERING SUBJECTS
1. M241AEC803A - Measuring Instruments 2. M241AEC803B - Communication Technologies

***Note:** Students should take Open Electives from the List of Open Electives Offered by Other Departments/Branches Only.

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3.	M241AEC103	C Programming for Engineers	3	0	0	3
4.	M241AEC104	Engineering Workshop	0	1	3	2.5
5.	M241AEC105	English for Skill Enhancement	2	0	0	2
6.	M241AEC106	Elements of Electronics and Communication Engineering	0	0	2	1
7.	M241AEC107	Applied Physics Laboratory	0	0	3	1.5
8.	M241AEC108	C Programming for Engineers Laboratory	0	0	2	1
9.	M241AEC109	English Language and Communication Skills Laboratory	0	0	2	1
10.	*M241AEC110	Environmental Science	3	0	0	0
		Induction Programme				
		Total	**14**	**3**	**12**	**20**

I Year II Semester

S. No.	Course Code	Course Title	L	T	P	Credits
1.	M241AEC201	Ordinary Differential Equations and Vector Calculus	3	1	0	4
2.	M241AEC202	Engineering Chemistry	3	1	0	4
3.	M241AEC203	Computer Aided Engineering Graphics	1	0	4	3
4.	M241AEC204	Basic Electrical Engineering	2	0	0	2
5.	M241AEC205	Electronic Devices and Circuits	2	0	0	2
6.	M241AEC206	Applied Python Programming Laboratory	0	1	2	2
7.	M241AEC207	Engineering Chemistry Laboratory	0	0	2	1
8.	M241AEC208	Basic Electrical Engineering Laboratory	0	0	2	1
9.	M241AEC209	Electronic Devices and Circuits Laboratory	0	0	2	1
		Total	**11**	**3**	**12**	**20**

M241AEC101: MATRICES AND CALCULUS

B.Tech. I Year I Sem. **L T P C**
3 1 0 4

Pre-requisites: Mathematical Knowledge at pre-university level

Course Objectives: To learn

- Types of matrices and their properties.
- Concept of a rank of the matrix and applying this concept to know the consistency and solvingthe system of linear equations.
- Concept of eigenvalues and eigenvectors and to reduce the quadratic form to canonical form
- Geometrical approach to the mean value theorems and their application to the mathematical problems
- Evaluation of surface areas and volumes of revolutions of curves.
- Evaluation of improper integrals using Beta and Gamma functions.
- Partial differentiation, concept of total derivative
- Finding maxima and minima of function of two and three variables.
- Evaluation of multiple integrals and their applications

Course outcomes: After learning the contents of this paper the student must be able to

- Write the matrix representation of a set of linear equations and to analyse the solution of thesystem of equations
- Find the Eigen values and Eigen vectors
- Reduce the quadratic form to canonical form using orthogonal transformations.
- Solve the applications on the mean value theorems.
- Evaluate the improper integrals using Beta and Gamma functions
- Find the extreme values of functions of two variables with/ without constraints.
- Evaluate the multiple integrals and apply the concept to find areas, volumes

UNIT-I: Matrices **10 L**

Rank of a matrix by Echelon form and Normal form, Inverse of Non-singular matrices by Gauss-Jordanmethod, System of linear equations: Solving system of Homogeneous and Non-Homogeneous equations by Gauss elimination method, Gauss Seidel Iteration Method.

UNIT-II: Eigen values and Eigen vectors **10 L**

Linear Transformation and Orthogonal Transformation: Eigen values, Eigenvectors and their properties, Diagonalization of a matrix, Cayley-Hamilton Theorem (without proof), finding inverse and power of a matrix by Cayley-Hamilton Theorem, Quadratic forms and Nature of the Quadratic Forms, Reduction ofQuadratic form to canonical forms by Orthogonal Transformation.

UNIT-III: Calculus **10 L**

Mean value theorems: Rolle 's Theorem, Lagrange's Mean value theorem with their Geometrical Interpretation and applications, Cauchy's Mean value Theorem, Taylor's Series.

Applications of definite integrals to evaluate surface areas and volumes of revolutions of curves (Only in Cartesian coordinates), Definition of Improper Integral: Beta and Gamma functions and their applications.

UNIT-IV: Multivariable Calculus (Partial Differentiation and applications) **10 L**

Definitions of Limit and continuity.

Partial Differentiation: Euler's Theorem, Total derivative, Jacobian, Functional dependence & independence. Applications: Maxima and minima of functions of two variables and three variables using method of Lagrange multipliers.

UNIT-V: Multivariable Calculus (Integration) 8 L

Evaluation of Double Integrals (Cartesian and polar coordinates), change of order of integration (only Cartesian form), Evaluation of Triple Integrals: Change of variables (Cartesian to polar) for double and(Cartesian to Spherical and Cylindrical polar coordinates) for triple integrals.
Applications: Areas (by double integrals) and volumes (by double integrals and triple integrals).

TEXT BOOKS:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.
2. R.K. Jain and S.R.K. Iyengar, Advanced Engineering Mathematics, Narosa Publications, 5th Editon, 2016.

REFERENCE BOOKS:

1. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
2. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9thEdition,Pearson, Reprint,2002.
3. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications,Reprint, 2008.
4. H. K. Dass and Er. Rajnish Verma, Higher Engineering Mathematics, S Chand and CompanyLimited, New Delhi.

M241AEC102: APPLIED PHYSICS

B.Tech. I Year I Sem.

L	T	P	C
3	1	0	4

Pre-requisites: 10 + 2 Physics

Course Objectives: The objectives of this course for the student are to:

1. Understand the basic principles of quantum physics and band theory of solids.
2. Understand the underlying mechanism involved in construction and working principles ofvarious semiconductor devices.
3. Study the fundamental concepts related to the dielectric, magnetic and energy materials.
4. Identify the importance of nanoscale, quantum confinement and various fabrications techniques.
5. Study the characteristics of lasers and optical fibres.

Course Outcomes: At the end of the course the student will be able to:

1. Understand physical world from fundamental point of view by the concepts of Quantum mechanics and visualize the difference between conductor, semiconductor, and an insulator by classification of solids.
2. Identify the role of semiconductor devices in science and engineering Applications.
3. Explore the fundamental properties of dielectric, magnetic materials and energy for theirapplications.
4. Appreciate the features and applications of Nanomaterials.
5. Understand various aspects of Lasers and Optical fiber and their applications in diverse fields.

UNIT - I: QUANTUM PHYSICS AND SOLIDS

Quantum Mechanics: Introduction to quantum physics, blackbody radiation – Stefan-Boltzmann's law, Wein's and Rayleigh-Jean's law, Planck's radiation law - photoelectric effect - Davisson and Germer experiment –Heisenberg uncertainty principle - Born interpretation of the wave function – timeindependent Schrodinger wave equation - particle in one dimensional potential box.

Solids: Symmetry in solids, free electron theory (Drude & Lorentz, Sommerfeld) - Fermi-Dirac distribution - Bloch's theorem -Kronig-Penney model – E-K diagram- effective mass of electron-origin of energy bands- classification of solids.

UNIT - II: SEMICONDUCTORS AND DEVICES

Intrinsic and extrinsic semiconductors – Hall effect - direct and indirect band gap semiconductors - construction, principle of operation and characteristics of P-N Junction diode, Zener diode and bipolarjunction transistor (BJT)–LED, PIN diode, avalanche photo diode (APD) and solar cells, their structure,materials, working principle and characteristics.

UNIT - III: DIELECTRIC, MAGNETIC AND ENERGY MATERIALS

Dielectric Materials: Basic definitions- types of polarizations (qualitative) - ferroelectric, piezoelectric,and pyroelectric materials – applications – liquid crystal displays (LCD) and crystal oscillators.

Magnetic Materials: Hysteresis - soft and hard magnetic materials - magnetostriction, magnetoresistance - applications - bubble memory devices, magnetic field sensors and multiferroics.

Energy Materials: Conductivity of liquid and solid electrolytes- superionic conductors - materials andelectrolytes for super capacitors - rechargeable ion batteries, solid fuel cells.

UNIT - IV: NANOTECHNOLOGY

Nanoscale, quantum confinement, surface to volume ratio, bottom-up fabrication: sol-gel, precipitation, combustion methods – top-down fabrication: ball milling - physical vapor deposition (PVD) - chemical vapor deposition (CVD) - characterization techniques - XRD, SEM &TEM - applications of nanomaterials.

UNIT - V: LASER AND FIBER OPTICS

Lasers: Laser beam characteristics-three quantum processes-Einstein coefficients and their relations-lasing action - pumping methods- ruby laser, He-Ne laser , CO_2 laser, Argon ion Laser, Nd:YAG laser-semiconductor laser-applications of laser.

Fiber Optics: Introduction to optical fiber- advantages of optical Fibers - total internal reflection-construction of optical fiber - acceptance angle - numerical aperture- classification of optical fibers-losses in optical fiber - optical fiber for communication system - applications.

TEXT BOOKS:

1. M. N. Avadhanulu, P.G. Kshirsagar & TVS Arun Murthy" A Text book of Engineering Physics"-S. Chand Publications, 11th Edition 2019.
2. Engineering Physics by Shatendra Sharma and Jyotsna Sharma, Pearson Publication,2019
3. Semiconductor Physics and Devices- Basic Principle – Donald A, Neamen, Mc Graw Hill,4thEdition,2021.
4. B.K. Pandey and S. Chaturvedi, Engineering Physics, Cengage Learning, 2ndEdition,2022.
5. Essentials of Nanoscience & Nanotechnology by Narasimha Reddy Katta, Typical CreativesNANO DIGEST, 1st Edition, 2021.

REFERENCE BOOKS:

1. Quantum Physics, H.C. Verma, TBS Publication, 2nd Edition 2012.
2. Fundamentals of Physics – Halliday, Resnick and Walker, John Wiley &Sons,11th Edition, 2018.
3. Introduction to Solid State Physics, Charles Kittel, Wiley Eastern, 2019.
4. Elementary Solid State Physics, S.L. Gupta and V. Kumar, Pragathi Prakashan, 2019.
5. A.K. Bhandhopadhya - Nano Materials, New Age International, 1stEdition, 2007.
6. Energy Materials a Short Introduction to Functional Materials for Energy Conversion andStorage Aliaksandr S. Bandarenka, CRC Press Taylor & Francis Group
7. Energy Materials, Taylor & Francis Group, 1st Edition, 2022.

M241AEC103: C PROGRAMMING FOR ENGINEERS

B.Tech. I Year I Sem.

L	T	P	C
3	0	0	3

Course Objectives:

1. To learn the fundamentals of computers.
2. To understand the various steps in Program development.
3. To learn the syntax and semantics of C Programming Language.
4. To learn the usage of structured programming approach in solving problems.

Course Outcomes: Upon completing this course, the students will be able to

1. Draw flowcharts for solving arithmetic and logical problems
2. Develop modular reusable code by understanding concepts of functions.
3. Formulate algorithms and programs using arrays, pointers, strings and structures.
4. Write a programs using Searching and sorting algorithms

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1	1	-	1	-	-	-	-	-	1
CO2	3	2	3	2	-	2	-	-	-	-	-	1
CO3	3	3	2	1	-	2	-	1	-	-	-	1
CO4	3	3	3	2		1	-	1				

UNIT- I

Introduction to Computer Algorithms and Programming

Components of a computer system: Memory, processor, I/O devices, storage, operating system, the concept of assembler, compiler, interpreter, loader, and linker.

From algorithm to program: Representation of an algorithm, flowchart, Pseudocode with examples,converting algorithms to programs.

Programming Basics: Structure of C program, writing and executing the first C program, Syntax andlogical errors in compilation, object, and executable code. Components of C language, standard I/O inC, data types, variables and constants, memory storage, and storage classes.

UNIT – II

Expressions and Statements

Expressions and their evaluation: Operands and Operators, formation of expressions using arithmetic, relational, logical, and bitwise operators, precedence and associativity rules, mixed operands, type conversion, and evaluation of expressions.

Statements: Simple and compound statements, Conditional Branching: if and switch statements, nested if-else, dangling else problem, use of break and default with switch. Iteration and loops: use ofwhile, do-while and for loops, nested loops, use of break and continue statements.

UNIT - III

Functions and Arrays

Designing Structured Programs: Introduction to functions, advantages of modularizing a program into functions, types of functions, passing parameters to functions: call by value, call by reference, passing arrays to functions, recursion with example programs.

Arrays: Array notation and representation, manipulating array elements, using multi-dimensional arrays, character arrays, C strings, string input/output functions, Array of strings, string manipulation functions with example programs.

UNIT – IV

Pointers and File handling

Pointers: Introduction, declaration, applications, dynamic memory allocation (malloc, calloc, realloc,free), use of pointers in self-referential structures.
File handling: File I/O functions, standard C pre-processors, defining and calling macros, command-line arguments.

UNIT – V
Derived types And Basic Algorithms:
Structures, Union, Enums and Bit-fields: Defining, declaring, and usage of structures, unions, andtheir arrays, passing structures, and unions to functions, introduction to enums and bit-fields.
Basic Algorithms: Searching and Sorting Algorithms (Bubble, Insertion, and Selection), finding rootsof equations, notion of order of complexity through example programs.

TEXT BOOKS:

1. B. A. Forouzan and R. F. Gilberg -Programming & Data Structures, 3rd Ed., Cengage Learning`
2. Byron Gottfried - Schaum's Outline of Programming with C, McGraw-Hill

REFERENCE BOOKS:

1. Ajay Mittal - Programming in C: A practical approach, Pearson Education, 2010
2. Kernighan Brian W. and Ritchie Dennis M.- The C programming, Pearson Education.
3. J. R. Hanlyand, E. B. Koffman -Problem Solving and Program Design, 5th Ed., PearsonEducation.
4. H. Cheng - C for Engineers and Scientists, McGraw-Hill International Edition
5. V. Rajaraman - Computer Basics and C Programming, PHI Learning, 2015.

M241AEC104: ENGINEERING WORKSHOP

B.Tech. I Year I Sem.

L	T	P	C
0	1	3	2.5

Pre-requisites: Practical skill

Course Objectives:

- To Study of different hand operated power tools, uses and their demonstration.
- To gain a good basic working knowledge required for the production of various engineeringproducts.
- To provide hands on experience about use of different engineering materials, tools, equipments and processes those are common in the engineering field.
- To develop a right attitude, team working, precision and safety at work place.
- It explains the construction, function, use and application of different working tools, equipmentand machines.
- To study commonly used carpentry joints.
- To have practical exposure to various welding and joining processes.
- Identify and use marking out tools, hand tools, measuring equipment and to work to prescribedtolerances.

Course Outcomes: At the end of the course, the student will be able to:

- CO 1: Study and practice on machine tools and their operations
- CO 2: Practice on manufacturing of components using workshop trades including pluming,fitting, carpentry, foundry, house wiring and welding.
- CO 3: Identify and apply suitable tools for different trades of Engineering processes includingdrilling, material removing, measuring, chiseling.
- CO 4: Apply basic electrical engineering knowledge for house wiring practice.

1. TRADES FOR EXERCISES:

At least two exercises from each trade:

I. Carpentry – (T-Lap Joint, Dovetail Joint, Mortise & Tenon Joint)
II. Fitting – (V-Fit, Dovetail Fit & Semi-circular fit)
III. Tin-Smithy – (Square Tin, Rectangular Tray & Conical Funnel)
IV. Foundry – (Preparation of Green Sand Mould using Single Piece and Split Pattern)
V. Welding Practice – (Arc Welding & Gas Welding)
VI. House-wiring – (Parallel & Series, Two-way Switch and Tube Light)
VII. Black Smithy – (Round to Square, Fan Hook and S-Hook)

2. TRADES FOR DEMONSTRATION & EXPOSURE:

Plumbing, Machine Shop, Metal Cutting (Water Plasma), Power tools in construction and WoodWorking

TEXT BOOKS:

1. Workshop Practice /B. L. Juneja / Cengage
2. Workshop Manual / K. Venugopal / Anuradha.

REFERENCE BOOKS:

1. Work shop Manual - P. Kannaiah/ K.L. Narayana/ Scitech
2. Workshop Manual / Venkat Reddy/ BSP

M241AEC105: ENGLISH FOR SKILL ENHANCEMENT

B.Tech. I Year I Sem. **L T P C**
2 0 0 2

Course Objectives: This course will enable the students to:

1. Improve the language proficiency of students in English with an emphasis on Vocabulary,Grammar, Reading and Writing skills.
2. Develop study skills and communication skills in various professional situations.
3. Equip students to study engineering subjects more effectively and critically using the theoretical and practical components of the syllabus.

Course Outcomes: Students will be able to:

1. Understand the importance of vocabulary and sentence structures.
2. Choose appropriate vocabulary and sentence structures for their oral and written communication.
3. Demonstrate their understanding of the rules of functional grammar.
4. Develop comprehension skills from the known and unknown passages.
5. Take an active part in drafting paragraphs, letters, essays, abstracts, précis and reports in various contexts.
6. Acquire basic proficiency in reading and writing modules of English.

UNIT - I

Chapter entitled '***Toasted English*' by R.K.Narayan** from ***"English: Language, Context and Culture"*** published by Orient BlackSwan, Hyderabad.

Vocabulary: The Concept of Word Formation -The Use of Prefixes and Suffixes - Acquaintance with Prefixes and Suffixes from Foreign Languages to form Derivatives - Synonyms and Antonyms

Grammar: Identifying Common Errors in Writing with Reference to Articles and Prepositions.

Reading: Reading and Its Importance- Techniques for Effective Reading.

Writing: Sentence Structures -Use of Phrases and Clauses in Sentences- Importance of Proper Punctuation- Techniques for Writing precisely – Paragraph Writing – Types, Structures and Features of a Paragraph - Creating Coherence-Organizing Principles of Paragraphs in Documents.

UNIT - II

Chapter entitled **'Appro JRD' by Sudha Murthy** from ***"English: Language, Context and Culture" published*** by Orient BlackSwan, Hyderabad.

Vocabulary: Words Often Misspelt - Homophones, Homonyms and Homographs

Grammar: Identifying Common Errors in Writing with Reference to Noun-pronoun Agreement andSubject-verb Agreement.

Reading: Sub-Skills of Reading – Skimming and Scanning – Exercises for Practice

Writing: Nature and Style of Writing- Defining /Describing People, Objects, Places and Events – Classifying- Providing Examples or Evidence.

UNIT - III

Chapter entitled **'Lessons from Online Learning' by F.Haider Alvi, Deborah Hurst et al** from ***"English: Language, Context and Culture"*** published by Orient BlackSwan, Hyderabad.

Vocabulary: Words Often Confused - Words from Foreign Languages and their Use in English.**Grammar:** Identifying Common Errors in Writing with Reference to Misplaced Modifiers and Tenses.

Reading: Sub-Skills of Reading – Intensive Reading and Extensive Reading – Exercises forPractice.

Writing: Format of a Formal Letter-Writing Formal Letters E.g.., Letter of Complaint, Letter ofRequisition, Email Etiquette, Job Application with CV/Resume.

UNIT - IV

Chapter entitled **'Art and Literature' by Abdul Kalam** from ***"English: Language, Context and Culture"*** published by Orient BlackSwan, Hyderabad.

Vocabulary: Standard Abbreviations in English

Grammar: Redundancies and Clichés in Oral and Written Communication.

Reading: Survey, Question, Read, Recite and Review (SQ3R Method) - Exercises for Practice

Writing: Writing Practices- Essay Writing-Writing Introduction and Conclusion -Précis Writing.

UNIT - V

Chapter entitled **'Go, Kiss the World' by Subroto Bagchi** from ***"English: Language, Context and Culture"*** published by Orient BlackSwan, Hyderabad.

Vocabulary: Technical Vocabulary and their Usage

Grammar: Common Errors in English (*Covering all the other aspects of grammar which were notcovered in the previous units*)

Reading: Reading Comprehension-Exercises for Practice

Writing: Technical Reports- Introduction – Characteristics of a Report – Categories of Reports Formats- Structure of Reports (Manuscript Format) -Types of Reports - Writing a Report.

Note: ***Listening and Speaking Skills which are given under Unit-6 in AICTE Model Curriculum are covered in the syllabus of ELCS Lab Course.***

- **Note: 1**. As the syllabus of English given in AICTE *Model Curriculum-2018 for B.Tech First Year is* ***Open-ended***, besides following the prescribed textbook, it is required to prepare teaching/learning materials **by the teachers collectively** in the form of handouts based on theneeds of the students in their respective colleges for effective teaching/learning in the class.

- **Note**: **2**.Based on the recommendations of NEP2020, teachers are requested to be flexible to adopt Blended Learning in dealing with the course contents .They are advised to teach 40 percent of each topic from the syllabus in blended mode.

TEXT BOOK:

1. "English: Language, Context and Culture" by Orient BlackSwan Pvt. Ltd, Hyderabad. 2022. Print.

REFERENCE BOOKS:

1. Effective Academic Writing by Liss and Davis (OUP)
2. Richards, Jack C. (2022) Interchange Series. Introduction, 1,2,3. Cambridge University Press
3. Wood, F.T. (2007). Remedial English Grammar. Macmillan.
4. Chaudhuri, Santanu Sinha. (2018). Learn English: A Fun Book of Functional Language,Grammar and Vocabulary. (2nd ed.,). Sage Publications India Pvt. Ltd.
5. (2019). Technical Communication. Wiley India Pvt. Ltd.
6. Vishwamohan, Aysha. (2013). English for Technical Communication for Engineering Students.Mc Graw-Hill Education India Pvt. Ltd.
7. Swan, Michael. (2016). Practical English Usage. Oxford University Press. Fourth Edition.

M241AEC106: ELEMENTS OF ELECTRONICS AND COMMUNICATION ENGINEERING

B.Tech. I Year I Sem.

L	T	P	C
0	0	2	1

Course outcomes: Students will be able to:

1. Identify the different components used for electronics applications
2. Measure different parameters using various measuring instruments
3. Distinguish various signal used for analog and digital communications

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1	1	1	1	-	-	1	-	-	1
CO2	3	2	3	2	1	2	-	-	1	-	-	1
CO3	3	3	2	1	1	2	-	-	1	-	-	1

List of Experiments:

1. Understand the significance of Electronics and communications subjects
2. Identify the different passive and active components
3. Color code of resistors, finding the types and values of capacitors
4. Measure the voltage and current using voltmeter and ammeter
5. Measure the voltage, current with Multimeter and study the other measurements usingMultimeter
6. Study the CRO and measure the frequency and phase of given signal
7. Draw the various Lissajous figures using CRO
8. Study the function generator for various signal generations
9. Study of Spectrum analyzer and measure the spectrum
10. Operate Regulated power supply for different supply voltages
11. Study the various gates module and write down the truth table of them
12. Identify various Digital and Analog ICs
13. Observe the various types of modulated signals.
14. Know the available Softwares for Electronics and communication applications

M241AEC107: APPLIED PHYSICS LABORATORY

B.Tech. I Year I Sem.

L	T	P	C
0	0	3	1.5

Course Objectives: The objectives of this course for the student to

1. Capable of handling instruments related to the Hall effect and photoelectric effect experimentsand their measurements.
2. Understand the characteristics of various devices such as PN junction diode, Zener diode, BJT, LED, solar cell, lasers and optical fiber and measurement of energy gap and resistivity of semiconductor materials.
3. Able to measure the characteristics of dielectric constant of a given material.
4. Study the behavior of B-H curve of ferromagnetic materials.
5. Understanding the method of least squares fitting.

Course Outcomes: The students will be able to:

1. Know the determination of the Planck's constant using Photo electric effect and identify thematerial whether it is n-type or p-type by Hall experiment.
2. Appreciate quantum physics in semiconductor devices and optoelectronics.
3. Gain the knowledge of applications of dielectric constant.
4. Understand the variation of magnetic field and behavior of hysteresis curve.
5. Carried out data analysis.

LIST OF EXPERIMENTS:

1. Determination of work function and Planck's constant using photoelectric effect.
2. Determination of Hall co-efficient and carrier concentration of a given semiconductor.
3. Characteristics of series and parallel LCR circuits.
4. V-I characteristics of a p-n junction diode and Zener diode
5. Input and output characteristics of BJT (CE, CB & CC configurations)
6. a) V-I and L-I characteristics of light emitting diode (LED)
   b) V-I Characteristics of solar cell
7. Determination of Energy gap of a semiconductor.
8. Determination of the resistivity of semiconductor by two probe method.
9. Study B-H curve of a magnetic material.
10. Determination of dielectric constant of a given material
11. a) Determination of the beam divergence of the given LASER beam
    b) Determination of Acceptance Angle and Numerical Apertureof an optical fiber.
12. Understanding the method of least squares – torsional pendulum as an example.

Note: *Any 8 experiments are to be performed.*

REFERENCE BOOK:

1. S. Balasubramanian, M.N. Srinivasan "A Text book of Practical Physics"- S Chand Publishers, 2017.

M241AEC108: C PROGRAMMING FOR ENGINEERS LABORATORY

B.Tech. I Year I Sem. **L T P C**
0 0 2 1

Course Outcomes: Upon completing this course, the students will be able to

1. Write algorithms and to draw flowcharts for solving problems and translate the algorithms/flowcharts to programs (in C language).
2. Use functions to develop modular reusable code.
3. Use arrays, pointers, strings and structures to formulate algorithms and programs.
4. Understand Searching and sorting algorithms

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1	1	1	1	-	-	1	-	1	1
CO2	3	2	3	2	1	2	-	-	1	-	1	1
CO3	3	3	2	1	1	2	-	-	1	-	1	1
CO4	3	3	3	2	1	1	-	-	1		1	

List of Experiments:

1. Write a C program to find the sum of individual digits of a positive integer.
2. Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence.
3. Write a C program to generate the first n terms of the sequence.
4. Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.
5. Write a C program to find the roots of a quadratic equation.
6. Write a C program to find the factorial of a given integer.
7. Write a C program to find the GCD (greatest common divisor) of two given integers.
8. Write a C program to solve Towers of Hanoi problem.
9. Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +,-,*, /, % and use Switch Statement)
10. Write a C program to find both the largest and smallest number in a list of integers.
11. Write a C program that uses functions to perform the following:
    i) Addition of Two Matrices ii) Multiplication of Two Matrices
12. Write a C program that uses functions to perform the following operations:
    i) To insert a sub-string in to a given main string from a given position.
    ii) To delete n Characters from a given position in a given string.
13. Write a C program to determine if the given string is a palindrome or not
14. Write a C program that displays the position or index in the string S where the string T begins, or – 1 if S doesn't contain T.
15. Write a C program to count the lines, words and characters in a given text.
16. Write a C program to generate Pascal's triangle.
17. Write a C program to construct a pyramid of numbers
18. Write a C program to read in two numbers, x and n, and then compute the sum of this geometricprogression:
    $1+x+x^2+x^3+ \ldots\ldots\ldots +x^n$
    For example: if n is 3 and x is 5, then the program computes 1+5+25+125.
    Print x, n, the sum
    Perform error checking.
    For example, the formula does not make sense for negative exponents – if n is less than 0.
    Have your program print an error message if n<0, then go back and read in the next pair of numbers of without computing the sum. Are any values of x also illegal ? If so, test for them too.

19. 2's complement of a number is obtained by scanning it from right to left and complementing all the bits after the first appearance of a 1. Thus 2's complement of 11100 is 00100. Write a C programto find the 2's complement of a binary number.
20. Write a C program to convert a Roman numeral to its decimal equivalent.

21. Write a C program that uses functions to perform the following operations:
    i) Reading a complex number
    ii) Writing a complex number
    iii) Addition of two complex numbers
    iv) Multiplication of two complex numbers
    (Note: represent complex number using a structure.)
22.
    i. Write a C program which copies one file to another.
    ii. Write a C program to reverse the first n characters in a file.(Note: The file name and n are specified on the command line.)
23.
    i. Write a C program to display the contents of a file.
    ii. Write a C program to merge two files into a third file (i.e., the contents of the first filefollowed by those of the second are put in the third file)

24. Write a C program that implements the following sorting methods to sort a given list of integers inascending order i) Bubble sort ii) Selection sort iii)Insertion sort
25. Write C programs that use both recursive and non recursive functions to perform the followingsearching operations for a Key value in a given list of integers:
    i) Linear search ii) Binary search

M241AEC109: ENGLISH LANGUAGE AND COMMUNICATION SKILLS LABORATORY

B.Tech. I Year I Sem. **L T P C**

0 0 2 1

The **English Language and Communication Skills (ELCS) Lab** focuses on the production and practice of sounds of language and familiarizes the students with the use of English in everyday situations both in formal and informal contexts.

Course Objectives:

- ✓ To facilitate computer-assisted multi-media instruction enabling individualized andindependent language learning
- ✓ To sensitize the students to the nuances of English speech sounds, word accent, intonation and rhythm
- ✓ To bring about a consistent accent and intelligibility in students' pronunciation ofEnglish by providing an opportunity for practice in speaking
- ✓ To improve the fluency of students in spoken English and neutralize the impact ofdialects.
- ✓ To train students to use language appropriately for public speaking, group discussions and interviews

Course Outcomes: Students will be able to:

- ✓ Understand the nuances of English language through audio- visual experience and group activities
- ✓ Neutralise their accent for intelligibility
- ✓ Speak with clarity and confidence which in turn enhances their employability skills

Syllabus: English Language and Communication Skills Lab (ELCS) shall have two parts:

a. Computer Assisted Language Learning (CALL) Lab

b. Interactive Communication Skills (ICS) Lab

Listening Skills:

Objectives

1. To enable students develop their listening skills so that they may appreciate the role in the LSRWskills approach to language and improve their pronunciation
2. To equip students with necessary training in listening, so that they can comprehend the speech of people of different backgrounds and regions

Students should be given practice in listening to the sounds of the language, to be able to recognize them and find the distinction between different sounds, to be able to mark stress and recognize and use the right intonation in sentences.

- Listening for general content
- Listening to fill up information
- Intensive listening
- Listening for specific information

Speaking Skills:

Objectives

1. To involve students in speaking activities in various contexts
2. To enable students express themselves fluently and appropriately in social and professional contexts

• Oral practice
• Describing objects/situations/people
• Role play – Individual/Group activities
• Just A Minute (JAM) Sessions

The following course content is prescribed for the **English Language and Communication Skills Lab**.

Exercise – I

CALL

Lab:

Understand: Listening Skill- Its importance – Purpose- Process- Types- Barriers- Effective Listening. *Practice*: Introduction to Phonetics – Speech Sounds – Vowels and Consonants – Minimal Pairs-Consonant Clusters- Past Tense Marker and Plural Marker- *Testing Exercises*

ICS Lab:

Understand: Spoken vs. Written language- Formal and Informal English.

Practice: Ice-Breaking Activity and JAM Session- Situational Dialogues – Greetings – Taking Leave – Introducing Oneself and Others.

Exercise – II

CALL Lab:

Understand: Structure of Syllables – Word Stress– Weak Forms and Strong Forms – Stress pattern in sentences – Intonation.

Practice: Basic Rules of Word Accent - Stress Shift - Weak Forms and Strong Forms- Stress pattern in sentences – Intonation - *Testing Exercises*

ICS Lab:

Understand: Features of Good Conversation – Strategies for Effective Communication.

Practice: Situational Dialogues – Role Play- Expressions in Various Situations –Making Requests andSeeking Permissions - Telephone Etiquette.

Exercise - III

CALL Lab:

Understand: Errors in Pronunciation-Neutralising Mother Tongue Interference (MTI).

Practice: Common Indian Variants in Pronunciation – Differences between British and American Pronunciation -*Testing Exercises*

ICS Lab:

Understand: Descriptions- Narrations- Giving Directions and Guidelines – Blog Writing

Practice: Giving Instructions – Seeking Clarifications – Asking for and Giving Directions – Thanking and Responding – Agreeing and Disagreeing – Seeking and Giving Advice – Making Suggestions.

Exercise – IV

CALL Lab:

Understand: Listening for General Details.

Practice: Listening Comprehension Tests - *Testing Exercises*

ICS Lab:

Understand: Public Speaking – Exposure to Structured Talks - Non-verbal Communication- Presentation Skills.

Practice: Making a Short Speech – Extempore- Making a Presentation.

Exercise – V

CALL Lab:

Understand: Listening for Specific Details.

Practice: Listening Comprehension Tests -*Testing Exercises*

ICS Lab:

Understand: Group Discussion

Practice: Group Discussion

Minimum Requirement of infrastructural facilities for ELCS Lab:

1. Computer Assisted Language Learning (CALL) Lab:

The Computer Assisted Language Learning Lab has to accommodate 40 students with 40 systems, with one Master Console, LAN facility and English language learning software for self- study by students.

System Requirement (Hardware component):

Computer network with LAN facility (minimum 40 systems with multimedia) with the following specifications:

i) Computers with Suitable Configuration
ii) High Fidelity Headphones

2. Interactive Communication Skills (ICS) Lab :

The Interactive Communication Skills Lab: A Spacious room with movable chairs and audio-visual aids with a Public Address System, a T. V. or LCD, a digital stereo –audio & video system and camcorder etc.

Source of Material (Master Copy):

- *Exercises in Spoken English. Part 1,2,3*. CIEFL and Oxford University Press

Note: Teachers are requested to make use of the master copy and get it tailor-made to suit the contents of the syllabus.

Suggested Software:

- Cambridge Advanced Learners' English Dictionary with CD.
- Grammar Made Easy by Darling Kindersley.
- Punctuation Made Easy by Darling Kindersley.
- Oxford Advanced Learner's Compass, 10th Edition.
- English in Mind (Series 1-4), Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge.
- English Pronunciation in Use (Elementary, Intermediate, Advanced) Cambridge UniversityPress.
- English Vocabulary in Use (Elementary, Intermediate, Advanced) Cambridge University Press.
- TOEFL & GRE (KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS).
- Digital All
- Orell Digital Language Lab (Licensed Version)

REFERENCE BOOKS:

1. (2022). *English Language Communication Skills – Lab Manual cum Workbook.* Cengage Learning India Pvt. Ltd.
2. Shobha, KN & Rayen, J. Lourdes. (2019). *Communicative English – A workbook.* CambridgeUniversity Press
3. Kumar, Sanjay & Lata, Pushp. (2019). *Communication Skills: A Workbook.* Oxford UniversityPress
4. Board of Editors. (2016). *ELCS Lab Manual: A Workbook for CALL and ICS Lab Activities.* Orient Black Swan Pvt. Ltd.
5. Mishra, Veerendra et al. (2020). *English Language Skills: A Practical Approach.* CambridgeUniversity Press

***M241AEC110: ENVIRONMENTAL SCIENCE**

B.Tech. I Year I Sem.

L	T	P	C
3	0	0	0

Course Objectives:

- Understanding the importance of ecological balance for sustainable development.
- Understanding the impacts of developmental activities and mitigation measures.
- Understanding the environmental policies and regulations

Course Outcomes:

- Based on this course, the Engineering graduate will understand /evaluate / develop technologies on the basis of ecological principles and environmental regulations which in turnhelps in sustainable development

UNIT - I

Ecosystems: Definition, Scope, and Importance of ecosystem. Classification, structure, and function of an ecosystem, Food chains, food webs, and ecological pyramids. Flow of energy, Biogeochemical cycles, Bioaccumulation, Biomagnification, ecosystem value, services and carrying capacity, Field visits.

UNIT - II

Natural Resources: Classification of Resources: Living and Non-Living resources, **water resources:** use and over utilization of surface and ground water, floods and droughts, Dams: benefits and problems. **Mineral resources:** use and exploitation, environmental effects of extracting and using mineral resources, **Land resources:** Forest resources, **Energy resources:** growing energy needs, renewable and non-renewable energy sources, use of alternate energy source, case studies.

UNIT - III

Biodiversity and Biotic Resources: Introduction, Definition, genetic, species and ecosystem diversity. Value of biodiversity; consumptive use, productive use, social, ethical, aesthetic and optional values. India as a mega diversity nation, Hot spots of biodiversity. Field visit. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts; conservation of biodiversity: In-Situ and Ex-situ conservation. National Biodiversity act.

UNIT - IV

Environmental Pollution and Control Technologies: Environmental Pollution: Classification of pollution, **Air Pollution:** Primary and secondary pollutants, Automobile and Industrial pollution, Ambient air quality standards. **Water pollution:** Sources and types of pollution, drinking water quality standards. **Soil Pollution:** Sources and types, Impacts of modern agriculture, degradation of soil. **Noise Pollution:** Sources and Health hazards, standards, **Solid waste:** Municipal Solid Waste management, composition and characteristics of e-Waste and its management. **Pollution control technologies:** Wastewater Treatment methods: Primary, secondary and Tertiary.

Overview of air pollution control technologies, Concepts of bioremediation. **Global Environmental Issues and Global Efforts: C**limate change and impacts on human environment. Ozone depletion and Ozone depleting substances (ODS). Deforestation and desertification. International conventions / Protocols: Earth summit, Kyoto protocol, and Montréal Protocol. NAPCC-GoI Initiatives.

UNIT - V

Environmental Policy, Legislation & EIA: Environmental Protection act, Legal aspects Air Act-1981, Water Act, Forest Act, Wild life Act, Municipal solid waste management and handling rules, biomedicalwaste management and handling rules, hazardous waste management and handling rules. EIA: EIA structure, methods of baseline data acquisition. Overview on Impacts of air, water, biological and Socio- economical aspects. Strategies for risk assessment, Concepts of Environmental Management Plan

(EMP). **Towards Sustainable Future:** Concept of Sustainable Development Goals, Population and its explosion, Crazy Consumerism, Environmental Education, Urban Sprawl, Human health, Environmental Ethics, Concept of Green Building, Ecological Foot Print, Life Cycle assessment (LCA),Low carbon life style.

TEXT BOOKS:

1 Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission.
2 Environmental Studies by R. Rajagopalan, Oxford University Press.

REFERENCE BOOKS:

1. Environmental Science: towards a sustainable future by Richard T. Wright. 2008 PHL LearningPrivate Ltd. New Delhi.
2. Environmental Engineering and science by Gilbert M. Masters and Wendell P. Ela. 2008 PHILearning Pvt. Ltd.
3. Environmental Science by Daniel B. Botkin & Edward A. Keller, Wiley INDIA edition.
4. Environmental Studies by Anubha Kaushik, 4^{th} Edition, New age international publishers.
5. Text book of Environmental Science and Technology - Dr. M. Anji Reddy 2007, BS Publications.
6. Introduction to Environmental Science by Y. Anjaneyulu, BS. Publications.

MOTHER TERESA INSTITUTE OF SCIENCE & TECHNOLOGY

AUTONOMOUS

B.Tech. in ELECTRONICS AND COMMUNICATION ENGINEERING COURSE STRUCTURE & SYLLABUS
(M24 Regulations)
Applicable from A.Y 2024-25 Batch

II Year I Semester **M24**

S.NO	CourseCode	Title of the Course	L	T	P/D	CH	C
1	M241AEC301	Transform Theory, Numerical Techniques & Complex Variables	3	0	0	3	4
2	M241AEC302	Analog Electronics	3	0	0	3	3
3	M241AEC303	Signals & Systems	3	1	0	4	4
4	M241AEC304	Switching Theory and Logic Design	3	0	0	3	3
5	M241AEC305	Network analysis and Synthesis	3	0	0	3	3
6	M241AEC306	Analog Electronics Laboratory	0	0	2	2	1
7	M241AEC307	Signals & Systems Laboratory	0	0	2	2	1
8	M241AEC308	Digital Logic Design Laboratory	0	0	2	2	1
9	*M241AEC309	Indian Constitution	3	0	0	3	0
		Total	**18**	**01**	**06**	**25**	**20**

II Year II Semester **M24**

S.NO	CourseCode	Title of the Course	L	T	P/D	CH	C
1	M241AEC401	Probability Theory & Stochastic Process	3	0	0	3	4
2	M241AEC402	Linear and Digital Integrated Circuits Applications	3	0	0	3	3
3	M241AEC403	Electromagnetic Waves and Transmission Lines	3	0	0	3	4
4	M241AEC404	Electronic Circuit Analysis	3	0	0	3	3
5	M241AEC405	Analog and Digital Communications	3	0	0	3	3
6	M241AEC406	Linear and Digital Integrated Circuits Applications Laboratory	0	0	2	2	1
7	M241AEC407	Electronic Circuit Analysis Laboratory	0	0	2	2	1
8	M241AEC408	Analog and Digital Communications Laboratory	0	0	2	2	1
9	*M241AEC409	Gender Sensitization Lab	0	0	3	3	0
		Total	**15**	**00**	**09**	**24**	**20**

L – Lecture T – Tutorial P – Practical D – Drawing CH – Contact Hours/Week C – Credits

BOARD OF STUDIES MEMBERS

S.No	Name of the Member	Signature	S.No	Name of the Member	Signature
1	Dr M MADHAVI LATHA		5	Dr G UDAYKIRAN BHARGAVA	
2	Dr G N SWAMY		6	Mr B RAVIKUMAR	
3	Dr S NAGARAJU RAO		7	Mrs CH PAVANI	
4	Mr PONAKALA RAJASEKHAR		8	Mr SK FHYSUDDIN	

M241AEC301: Transform Theory, Numerical Techniques & Complex Variables

B.Tech II Year I Sem

L	T	P	C
3	0	0	4

Pre-requisites: Mathematics courses of Second year of study.

Course Objectives:

- To learn Expressing periodic function by Fourier series and a non-periodic function by Fourier transforms
- Various numerical methods to find roots of polynomial and transcendental equations.
- Concept of finite differences and to estimate the value for the given data using interpolation.
- Solving ordinary differential equations of first order using numerical techniques
- Differentiation and integration of complex valued functions.
- Evaluation of integrals using Cauchy's integral formula and Cauchy's residue theorem.

Course outcomes:

- After learning the contents of this paper the student must be able to Express any periodic function in terms of sine and cosine
- Find the root of a given polynomial and transcendental equations.
- Estimate the value for the given data using interpolation
- Find the numerical solutions for a given first order ODE's
- Analyze the complex function with reference to their analyticity, integration using Cauchy's integral and residue theorems

UNIT-I: Fourier Series

Definition of periodic function, Dirichlet's Conditions - Fourier expansion of periodic functions in a given interval, Determination of Fourier coefficients – Fourier series of even and odd functions, Half-range Fourier series

UNIT-II: Fourier Transforms

Fourier Transforms: Fourier integral theorem - Fourier sine and cosine integrals, Fourier transforms – Fourier sine and cosine transforms – properties – inverse transforms – Finite Fourier transforms.

UNIT-III: Numerical Methods

Solution of polynomial and transcendental equations: Bisection method, Iteration Method, NewtonRaphson method and Regula-Falsi method. Finite differences: forward differences, backward differences, central differences, symbolic relations and separation of symbols, Interpolation using Newton's forward and backward difference formulae. Central difference interpolation: Gauss's forward and backward formulae, Lagrange's method of interpolation , Numerical integration: Trapezoidal rule and Simpson's 1/3rd and 3/8th rules.

UNIT-IV: COMPLEX Differentiation

Functions of a complex variable: Analyticity – Properties – Cauchy-Riemann equations in Cartesian and polar coordinates. Harmonic and conjugate harmonic functions, Construction of analytic functions using Milne – Thompson method.

UNIT-V: Complex Integration

Line integral, Evaluation along a path and by indefinite integration, Cauchy's integral theorem, Cauchy's integral formula, Generalized integral formula. Singularities: Poles and Residues, Evaluation of residues by Cauchy Residue theorem

TEXT BOOKS:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.

2. S.S. Sastry, Introductory methods of numerical analysis, PHI, 4th Edition, 2005.

REFERENCE BOOKS:

1. M. K. Jain, S.R.K. Iyengar, R.K. Jain, Numerical methods for Scientific and Engineering Computations, New Age International publishers.

2. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.

3. J. W. Brown and R. V. Churchill, Complex Variables and Applications, 7th Edition, Mc-Graw Hill, 2004.

M241AEC302: ANALOG ELECTRONICS

B.Tech. II Year I Sem.

L	T	P	C
3	0	0	3

Pre-requisite: Electronic Devices and Circuits

Course Objectives:

1. Learn the concepts of, load line analysis and biasing techniques
2. Learn the concepts of high frequency analysis of transistors.
3. To give understanding of various types of amplifier circuits
4. Learn the concepts of small signal analysis of BJT and FET
5. To familiarize the Concept of feedback in amplifiers so as to differentiate between negative and positive feedback.

Course Outcomes: Upon completing this course, the students will be able to

1. Design the amplifiers with various biasing techniques.
2. Design single stage amplifiers using BJT and FET
3. Design multistage amplifiers and understand the concepts of High Frequency Analysis of BJT.
4. Utilize the Concepts of negative feedback to improve the stability of amplifiers and positive feedback to sustained oscillations.

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	3	3	2	-	-	-	-	-	-	-	1
CO2	2	3	3	2	-	-	-	-	-	-	-	1
CO	2	3	3	2	-	-	-	-	-	-	-	1
CO4	2	3	3	2	-	-	-	-	-	-	-	1

UNIT - I

BJT Biasing: Transistor Biasing and Stabilization - Operating point, DC & AC load lines, Biasing - Fixed Bias, Self Bias, Bias Stability, Bias Compensation using Diode

Analysis and Design of Small Signal Low Frequency BJT Amplifiers: Transistor Hybrid model, Determination of h-parameters from transistor characteristics, Typical values of h- parameters in CE, CB and CC configurations, Transistor amplifying action, Analysis of CE, CC, CB Amplifiers and CE Amplifier with emitter resistance, low frequency response of BJT Amplifiers, effect of coupling and bypass capacitors on CE Amplifier.

UNIT - II

Multistage Amplifiers: Classification of Amplifiers, Distortion in amplifiers, Different coupling schemes used in amplifiers, Frequency response and Analysis of multistage amplifiers, Cascade RC Coupled amplifiers, Cascode amplifier, Darlington pair.

Transistor at High Frequency: Hybrid -πmodel of Common Emitter transistor model, f_α, f_β and unity gain bandwidth, Gain-bandwidth product.

UNIT - III

Feedback Amplifiers: Concepts of feedback – Classification of feedback amplifiers – General characteristics of Negative feedback amplifiers – Effect of Feedback on Amplifier characteristics –series, Voltage shunt, Current series and Current shunt Feedback configurations – Simple problems.

UNIT – IV
Linear Wave Shaping

High pass and low pass RC circuits and their response for Sinusoidal, Step, Pulse, Square, & Ramp inputs, High pass RC network as Differentiator, Low pass RC circuit as an Integrator, Attenuators and its application as a CRO Probe.

Non-Linear Wave Shaping

Diode clippers, Transistor clippers, Clipping at two independent levels,Comparators, Applications of Voltage comparators. Clamping Operation, Clamping Circuit Theorem.

UNIT – V

Multivibrators: Analysis and Design of Bistable, Monostable, Astable Multivibrators and Schmitt trigger using Transistors.

TEXT BOOKS:

1. Jacob Millman, Christos C Halkias -Integrated Electronics, McGraw Hill Education.
2. Robert L. Boylestead, Louis Nashelsky -Electronic Devices and Circuits theory, 11th Edition,2009, Pearson
3. J. Millman, H. Taub and Mothiki S. PrakashRao - Pulse, Digital and Switching Waveforms –2nd Ed., TMH, 2008,

REFERENCE BOOKS:

1. David A. Bell – Electronic Devices and Circuits, 5th Edition, Oxford.
2. Adel S. Sedra, Kenneth C. Smith- Microelectronic Circuits- Theory and Applications, Oxford.
3. Chinmoy Saha, Arindam Halder, Debaati Ganguly -Basic Electronics- Principles andApplications, 2018, Cambridge.
4. Ronald J. Tocci - Fundamentals of Pulse and Digital Circuits, 3rd Ed., 2008.
David A. Bell - Pulse, Switching and Digital Circuits, 5th Ed., Oxford, 2015

M241AEC303: SIGNALS AND SYSTEMS

B.Tech. II Year I Sem.

L	T	P	C
3	1	0	4

Course Objectives: The objectives of this subject are to:

1. Classify signals and systems and their analysis in time and frequency domains.
2. Study the concepts of distortion less transmission through LTI systems, convolution and correlation properties.
3. Understand Laplace and Z-transforms their properties for analysis of signals and systems.
4. Identify the need for sampling of CT signals, types and merits and demerits of each type.

Course Outcomes: Upon completing this course the students able to:

1. Characterize various signals, systems and their time and frequency domain analysis, using transform techniques.
2. Identify the conditions for transmission of signals through systems and conditions for physical realization of systems.
3. Use sampling theorem for baseband and band pass signals for various types of sampling and for different duty cycles.
4. Apply the correlation and PSD functions for various applications.

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	-	-	-	-	-	-	-	-	-	1
CO2	3	3	2	-	-	-	-	-	-	-	-	1
CO3	3	3	2	2	-	-	-	-	-	-	-	1
CO4	3	3	2	2	-	-	-	-	-	-	-	1

UNIT - I

Signal Analysis: Analogy between Vectors and Signals, Orthogonal Signal Space, Signal approximation using Orthogonal functions, Mean Square Error, Closed or complete set of Orthogonal functions, Orthogonality in Complex functions, Classification of Signals and systems, Exponential and Sinusoidal signals, Concepts of Impulse function, Unit Step function, Signum function.

UNIT – II

Fourier series: Representation of Fourier series, Continuous time periodic signals, Properties of Fourier Series, Dirichlet's conditions, Trigonometric Fourier Series and Exponential Fourier Series, Complex Fourier spectrum.

Fourier Transforms: Deriving Fourier Transform from Fourier series, Fourier Transform of arbitrary signal, Fourier Transform of standard signals, Fourier Transform of Periodic Signals, Properties of Fourier Transform, Fourier Transforms involving Impulse function and Signum function, Introduction to Hilbert Transform.

UNIT - III

Signal Transmission through Linear Systems: Linear System, Impulse response, Response of a Linear System, Linear Time Invariant(LTI) System, Linear Time Variant (LTV) System, Transfer function of a LTI System, Filter characteristic of Linear System, Distortion less transmission through a system, Signal bandwidth, System Bandwidth, Ideal LPF, HPF, and BPF characteristics, Causality and Paley- Wiener criterion for physical realization, Relationship between Bandwidth and rise time, Convolution and Correlation of Signals, Concept of convolution in Time domain

and Frequency domain, Graphical representation of Convolution.

UNIT – IV

Laplace Transforms: Laplace Transforms (L.T), Inverse Laplace Transform, Concept of Region of Convergence (ROC) for Laplace Transforms, Properties of L.T, Relation between L.T and F.T of a signal, Laplace Transform of certain signals using waveform synthesis.

Z–Transforms: Concept of Z- Transform of a Discrete Sequence, Distinction between Laplace, Fourier and Z Transforms, Region of Convergence in Z-Transform, Constraints on ROC for various classes of signals, Inverse Z-transform, Properties of Z-transforms.

UNIT - V

Sampling theorem: Graphical and analytical proof for Band Limited Signals, Impulse Sampling, Natural and Flat top Sampling, Reconstruction of signal from its samples, Effect of under sampling – Aliasing, Introduction to Band Pass Sampling.

Correlation: Cross Correlation and Auto Correlation of Functions, Properties of Correlation Functions, Energy Density Spectrum, Parsevals Theorem, Power Density Spectrum, Relation between Autocorrelation Function and Energy/Power Spectral Density Function, Relation between Convolution and Correlation, Detection of Periodic Signals in the presence of Noise by Correlation, Extraction of Signal from Noise by Filtering.

TEXT BOOKS

1. B.P. Lathi -Signals, Systems & Communications, BSP, 2013.
2. A.V. Oppenheim, A.S. Willsky and S.H. Nawabi -Signals and Systems, 2nd Ed., Prentice Hall

REFERENCE BOOKS

1. Simon Haykin and Van Veen, A. Rama Krishna Rao, -Signals and Systems, TMH, 2008.
2. Michel J. Robert - Fundamentals of Signals and Systems, MGH International Edition, 2008.
3. C. L. Philips, J. M. Parr and Eve A. Riskin -Signals, Systems and Transforms, 3rd Ed., PE, 2004.

M241AEC304: SWITCHING THEORY AND LOGIC DESIGN

B.Tech. II Year I Sem. **L T P C**
3 0 0 3

COURSEOBJECTIVES:

- To analyze and explore number conversions for building digital circuits
- To explore logic functions for building digital logic circuits
- To explore the combinational logic circuits and PLD's
- To implement and examine the operation of sequential circuits
- To analysis of counters, registers and clocked sequential circuits

COURSEOUTCOMES: After completion of the course, the student should be able to
CO-1: Understand the knowledge on logic families and number systems
CO-2: Apply the concepts of Boolean algebra to minimize the digital systems
CO-3: Design combinational circuits for various digital applications
CO-4: Analyze and design sequential circuits for digital applications
CO-5: Acquire the knowledge on FSM to implement the digital systems

COURSEARTICULATIONMATRIX:
(CorrelationofCourseOutcomeswithProgramOutcomesandProgramSpecificOutcomesusing **mappinglevels1=Slight,2=Moderateand3=Substantial**)

CO	PROGRAMOUTCOMES(PO)												PROGRAM SPECIFIC OUTCOMES(PSO)		
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO-1	3	3	3	2	2	-	-	-	-	-	-	1	2	-	2
CO-2	3	3	3	2	2	-	-	-	-	-	-	1	2	-	2
CO-3	3	3	3	2	2	-	-	-	-	-	-	1	2	-	2
CO-4	3	3	3	2	2	-	-	-	-	-	-	1	2	-	2
CO-5	3	3	3	2	2	-	-	-	-	-	-	1	3	-	3

UNIT-I:

Digital Logic Families: Characteristics of logic families, TTL NAND gate, CMOS logic: Inverter, NAND, NOR gates, Tristate logic, Tristate TTL inverter.

Numbers Systems and Codes: Review of number systems, number base conversion, binary arithmetic, binary weighted and non-weighted codes, Complements, signed binary numbers, Fixed-point representation, Floating -Point Representation, Gray code and its applications.

UNIT-II:

Boolean Algebra and Gate Level Minimization: Binary Logic, Postulates and theorems, representation of switching functions, SOP and POS forms–Canonical forms, digital logic gates, Karnaugh Maps–minimization using two variable, three variable, four and variable K-Maps, Don't Care Conditions, NAND and NOR implementation, Exclusive-OR function, introduction to Tabulation method.

UNIT-III:

Design of Combinational Circuits: Combinational Circuits - Analysis and Design Procedure, Binary adders, Binary subtractors, Adder/Subtractor, carry look ahead adder, magnitude comparator, Decoders, Encoders, 4 to 2 priority encoders, Multiplexers, Implementation of Boolean functions using Multiplexers, Demultiplexers, Code Converters, Binary multiplier, BCD adder.

PLD's: Programmable Read Only Memory, Programmable Logic Array, Programmable Array Logic.

UNIT-IV:

SequentialCircuits-1: Combinational Vs Sequential Circuits, Latches, Flip-Flops-RS flip flop, D flip flop, JK flip flop, T flip flop, Triggering of Flip-Flops, Master-Slave Flip flop, Flip Flops excitation functions, Conversion of one flip-flop to another flip-flop, Design of Synchronous counters, Asynchronous counters.

UNIT-V:

Sequential Circuits-2: Registers, Universal shift register, Synchronous Vs Asynchronous sequential circuits, Analysis of clocked sequential circuits, State Table, State Diagram, State Reduction and State Assignment, Sequence detector, Finite State Machine, Mealy and Moore Machines.

TEXTBOOKS:

1. Digital Design, M.Morris Mano,3rdEdition, Pearson Education/PHI, 2003
2. Modern Digital Electronics,R.P.Jain,5thEdition,McGraw-HillEducation,2022
3. LogicDesignTheory,NripendraN.Biswas,PrenticeHallofIndia,2001

REFERENCES:

1. Fundamentals of Logic Design, Roth, 5thEdition, Thomson,2004
2. Switching and Finite AutomataTheory,ZviKohavi,2ndEdition, Tata McGraw-Hill, 1995
3. SwitchingandLogicDesign,C.V.S.Rao,PearsonEducation,2005
4. Digital Principles and Design. Donald D. Givone,TataMcGraw-Hill,2002

M241AEC305: NETWORK ANALYSIS AND SYNTHESIS

B.Tech. II Year I Sem. **L T P C**
3 0 0 3

Course Objectives:

1. To understand the basic concepts on RLC circuits.
2. To know the behavior of the steady state and transient states in RLC circuits.
3. To understand the two port network parameters.
4. Learn the design concepts of various filters and attenuators

Course Outcomes: Upon successful completion of the course, students will be able to:

1. Gain the knowledge on basic RLC circuits behavior.
2. Analyse the Steady state and transient analysis of RLC Circuits.
3. Characterization of two port network parameters.
4. Analyse the Design aspect of various filters and attenuators

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1	-	-	-	1	-	-	-	-	1
CO2	2	3	2	-	-	-	1	-	-	-	-	1
CO3	3	2	1	-	-	-	-	-	-	-	-	1
CO4	2	3	3	-	-	-	1	-	-	-	-	1

UNIT - I

Network Topology: Basic cutset and tie set matrices for planar networks, Magnetic Circuits, Self and Mutual inductances, dot convention, impedance, reactance concept, Impedance transformation and coupled circuits, co-efficient of coupling, equivalent T for Magnetically coupled circuits, Ideal Transformer.

UNIT - II

Transient and Steady state analysis: RC, RL and RLC Circuits, Sinusoidal, Step and Square responses. 2^{nd} order series and parallel RLC Circuits, damping factor, over damped, under damped, critically damped cases, quality factor and bandwidth for series and parallel resonance, resonance curves.

UNIT - III

Two port network parameters: Z, Y, ABCD, h and g parameters, Characteristic impedance, Image transfer constant, image and iterative impedance, network function, driving point and transfer functions – using transformed (S) variables, Poles and Zeros. Standard T, π, L Sections, Characteristic impedance, image transfer constants, Design of Attenuators, impedance matching network.

UNIT-IV

Filters: Classification of Filters, Filter Networks, Constant-K Filters-Low pass, high pass, Band pass, band-stop filters, M-derived Filters- T and π filters- Low pass, high pass

Attenuators: Types – T, π and lattice ,Asymmetrical Attenuators T, π , L Equalizers-Types- Series, Shunt, Constant resistance, bridge T attenuation, bridge T phase, Lattice attenuation.

UNIT – V

Network Synthesis: Driving point impedance and admittance, transfer impedance and admittance, network functions of Ladder and non ladder networks, Poles, Zeros analysis of network functions**,** Hurwitz polynomials, Positive Real Functions, synthesis of LC, RC and RL Functions by foster and causer methods.

TEXT BOOKS:

1. Van Valkenburg -Network Analysis, 3rd Ed., Pearson, 216.
2. JD Ryder - Networks, Lines and Fields, 2nd Ed., PHI, 1999.

REFERENCE BOOKS:

1. J. Edminister and M. Nahvi - Electric Circuits, Schaum's Outlines, Mc Graw Hills Education, 1999.
2. A. Sudhakar and Shyammohan S Palli - Networks & Circuits, 4th Ed., Tata McGraw- Hill Publications
3. William Hayt and Jack E. Kimmerley - Engineering Circuit Analysis, 6th Ed., William Hayt and Jack E. Kimmerley, McGraw Hill Company

M241AEC306: ANALOG ELECTRONICS LABORATORY

B.Tech. II Year I Sem.

L	T	P	C
0	0	2	1

Course Outcomes: Upon completing this course the students will be able to

1. Design amplifiers with required Q point and analyse amplifier characteristics
2. Examine the effect multistage amplification on frequency response
3. Investigate feedback concept in amplifiers and oscillator

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	-	2	-	3	-	-	3	3	-	-	1
CO2	1	-	2	-	3	-	-	3	3	-	-	1
CO3	1	-	2	-	3	-	-	3	3	-	-	1

List of Experiments (Twelve experiments to be done):

Verify any twelve experiments in S/W Laboratory Using B2 Spice/Multisim

Design and simulate

1. Transistor Amplifier Circuit
2. Transistor as A Switch Circuit.
3. CE amplifiers and plot its frequency response.
4. CB amplifiers and plot its frequency response.
5. CC amplifiers and plot its frequency response.
6. Common Drain Amplifier and plot its frequency response.
7. Commons Source Amplifier and plot its frequency response.
8. Two stage RC Coupled amplifier
9. Two stage Direct Coupled amplifier
10. Voltage series feedback amplifiers and plot its frequency response.
11. Voltage Shunt feedback amplifiers and plot its frequency response.
12. Current series feedback amplifiers and plot its frequency response.
13. Current Shunt feedback amplifiers and plot its frequency response.
14. RC phase shift oscillator circuit for the given frequency and draw the output waveform.
15. Colpitts oscillator circuit for the given frequency and draw the output waveform.
16. Hartely oscillator circuit for the given frequency and draw the output waveform.

M241AEC307: SIGNALS AND SYSTEMS LABORATORY

B.Tech. II Year I Sem.

L	T	P	C
0	0	2	1

Course Outcomes: Upon completing this course, the students will be able to

1. Generate, analyze and perform various operations on Signals/Sequences both in time and Frequency domain
2. Analyze and Characterize Continuous and Discrete Time Systems both in Time and Frequency domain along with the concept of Sampling
3. Generate different Random Signals and capable to analyze their Characteristics
4. Apply the Concepts of Deterministic and Random Signals for Noise removal Applications and on other Real Time Signals

Note:

- All the experiments are to be simulated using MATLAB or equivalent software
- Minimum of 12 experiment are to be completed

List of Experiments:

1. Basic Operations on Matrices.
2. Generation of Various Signals and Sequences (Periodic and Aperiodic), such as Unit Impulse, Unit Step, Square, Saw tooth, Triangular, Sinusoidal, Ramp, Sinc.
3. Operations on Signals and Sequences such as Addition, Multiplication, Scaling, Shifting, Folding, Computation of Energy and Average Power.
4. Finding the Even and Odd parts of Signal/Sequence and Real and Imaginary parts of Signal.
5. Convolution for Signals and sequences.
6. Auto Correlation and Cross Correlation for Signals and Sequences.
7. Verification of Linearity and Time Invariance Properties of a given Continuous/Discrete System.
8. Computation of Unit sample, Unit step and Sinusoidal responses of the given LTI system and verifying its physical realiazability and stability properties.
9. Gibbs Phenomenon Simulation.
10. Finding the Fourier Transform of a given signal and plotting its magnitude and phase spectrum.
11. Waveform Synthesis using Laplace Transform.
12. Generation of Gaussian noise (Real and Complex)
13. Verification of Sampling Theorem.
14. Removal of noise by Autocorrelation / Cross correlation.
15. Extraction of Periodic Signal masked by noise using Correlation

Major Equipment required for Laboratories:

1. Computer System with latest specifications connected
2. Window Xp or equivalent
3. Simulation software-MAT Lab or any equivalent simulation software

M241AEC308: DIGITAL LOGIC DESIGN LABORATORY

B.Tech. II Year I Sem.

L	T	P	C
0	0	2	1

COURSEOBJECTIVES:

- To get familiarity with functionalities of IC's
- To model, and simulate digital circuits using Hardware Description Language (HDL)
- To learn writing test-benches for functional verification of the digital system

COURSEOUTCOMES: After completion of the course, the student should be able to

CO-1: Verify the functionality of various Digital ICs

CO-2: Apply Hardware Description Languages (HDL) for designing and functional verification of combinational circuits

CO-3: Design and verify the functionality of sequential circuits using Verilog HDL

COURSEARTICULATIONMATRIX:

(CorrelationofCourseOutcomeswithProgramOutcomesandProgramSpecificOutcomesusing **mappinglevels1=Slight,2=Moderateand3=Substantial**)

CO	PROGRAMOUTCOMES(PO)												PROGRAM SPECIFIC OUTCOMES(PSO)		
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO-1	3	2	2	2	3	-	-	-	3	3	2	-	3	-	3
CO-2	3	2	2	2	3	-	-	-	3	3	2	-	2	-	2
CO-3	3	2	2	2	3	-	-	-	3	3	2	-	2	-	2

LIST OF EXPERIMENTS: (Twelve experiments to be done)

1. Design and simulate the following Circuits using HDL:
2. Design and simulate Logic circuit
3. Design and simulate given Boolean function using universal gates and minimizing the same. Compare thegate count before and after minimization.
4. Design and simulate Full Adder circuit using gates/universal gates. Implement Full Subtractor usingfull adder.
5. Design and simulate a 2 – bit Comparator using AND, OR and NOT gates. Realize 4 – bit Comparator using 2– bit Comparators.
6. Design and simulate 2:1 MUX using the given gates and Design 8:1 using 2:1 MUX.
7. Design and simulate the given Boolean function using the given MUX (ex: code converters).
8. Design and simulate a 2x4 Decoder using logic gates and implement 3x8 Decoder using 2x4 Decoder.
9. Design and simulate the given Boolean function using given Decoders.
10. Design and simulate Demultiplexer to Decoder and vice versa.
11. Design and simulate Parity generator and checker
12. Design and simulate of truth tables of flip-flops using different clocks (level triggering, Positive and negative edge triggering) also converts the given flip-flop from one type to other.
13. Design and simulate Universal n-bit shift register using flip-flops and Multiplexers.
14. Draw the timing diagramof the Shift Register.
15. Design and simulate a Synchronous binary counter using D-flip-flop/given flip-flop.
16. Design and simulate a asynchronous counter for the given sequence using given flip-flops.
17. Design and simulate of MOD 8 Counter using JK flip-flops

***M241AEC309: CONSTITUTION OF INDIA**

B.Tech. II Year I Sem. **L T P C**
3 0 0 0

Course Objectives: Students will be able to:

- Understand the premises informing the twin themes of liberty and freedom from a civil rights perspective.
- To address the growth of Indian opinion regarding modern Indian intellectuals' constitutional role and entitlement to civil and economic rights as well as the emergence of nationhood in the early years of Indian nationalism.
- To address the role of socialism in India after the commencement of the Bolshevik Revolution in 1917 and its impact on the initial drafting of the Indian Constitution.

Course Outcomes: Students will be able to:

- Discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics.
- Discuss the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India.
- Discuss the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution
- Discuss the passage of the Hindu Code Bill of 1956.

Unit - 1 History of Making of the Indian Constitution- History of Drafting Committee.

Unit - 2 Philosophy of the Indian Constitution- Preamble Salient Features

Unit - 3 Contours of Constitutional Rights & Duties - Fundamental Rights

- Right to Equality
- Right to Freedom
- Right against Exploitation
- Right to Freedom of Religion
- Cultural and Educational Rights
- Right to Constitutional Remedies
- Directive Principles of State Policy
- Fundamental Duties.

Unit - 4 Organs of Governance: Parliament, Composition, Qualifications and Disqualifications, Powers and Functions, Executive, President, Governor, Council of Ministers, Judiciary, Appointment and Transfer of Judges, Qualifications, Powers and Functions

Unit - 5 Local Administration: District's Administration head: Role and Importance, Municipalities: Introduction, Mayor and role of Elected Representative, CEO of Municipal Corporation. Panchayat raj: Introduction, PRI: Zila Panchayat. Elected officials and their roles, CEO ZilaPanchayat: Position and role. Block level: Organizational Hierarchy (Different departments), Village level: Role of Elected and Appointed officials, Importance of grass root democracy

Unit - 6 Election Commission: Election Commission: Role and Functioning. Chief Election Commissioner and Election Commissioners. State Election Commission: Role and Functioning. Institute and Bodies for the welfare of SC/ST/OBC and women.

Suggested Reading:

1. The Constitution of India, 1950 (Bare Act), Government Publication.
2. Dr. S. N. Busi, Dr. B. R. Ambedkar framing of Indian Constitution, 1st Edition, 2015.

M241AEC401: PROBABILITY THEORY AND STOCHASTIC PROCESSES

B.Tech. II Year II Sem. **L T P C**
3 0 0 4

Pre-requisite: Mathematics

Course Objectives:

1. This gives basic understanding of random variables and operations that can be performed on them.
2. To known the Spectral and temporal characteristics of Random Process.
3. To Learn the Basic concepts of Information theory Noise sources and its representation for understanding its characteristics.

Course Outcomes: Upon completing this course, the students will be able to:

1. Perform operations on single and multiple Random variables.
2. Determine the Spectral and temporal characteristics of Random Signals.
3. Characterize LTI systems driven by stationary random process by using ACFs and PSDs.
4. Understand the concepts of Noise and Information theory in Communication systems.

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12
CO1	3	3	-	2	-	-	-	-	-	-	-	-
CO2	3	3	-	2	-	-	-	-	-	-	-	-
CO3	3	3	3	2	-	-	-	-	-	-	-	-
CO4	3	3	3	2	-	-	-	-	-	-	-	-

UNIT - I

Probability & Random Variable: Probability introduced through Sets and Relative Frequency: Experiments and Sample Spaces, Discrete and Continuous Sample Spaces, Events, Probability Definitions and Axioms, Joint Probability, Conditional Probability, Total Probability, Bay's Theorem, Independent Events, *Random Variable*-Definition, Conditions for a Function to be a Random Variable, Discrete, Continuous and Mixed Random Variable, Distribution and Density functions, Properties, Binomial, Poisson, Uniform, Gaussian, Exponential, Rayleigh, Methods of defining Conditioning Event, Conditional Distribution, Conditional Density and their Properties.

UNIT - II

Operations on Single & Multiple Random Variables – Expectations: Expected Value of a Random Variable, Function of a Random Variable, Moments about the Origin, Central Moments, Variance and Skew, Chebychev's Inequality, Characteristic Function, Moment Generating Function, Transformations of a Random Variable: Monotonic and Non-monotonic Transformations of Continuous Random Variable, Transformation of a Discrete Random Variable.

Vector Random Variables, Joint Distribution Function and its Properties, Marginal Distribution Functions, Conditional Distribution and Density – Point Conditioning, Conditional Distribution and Density — Interval conditioning, Statistical Independence.

Sum of Two Random Variables, Sum of Several Random Variables, Central Limit Theorem, (Proof not expected). Unequal Distribution, Equal Distributions. Expected Value of a Function of Random Variables: Joint Moments about the Origin, Joint

Central Moments, Joint Characteristic Functions, Jointly Gaussian Random Variables: Two Random Variables case, N Random Variable case, Properties, Transformations of Multiple Random Variables, Linear Transformations of Gaussian Random Variables.

UNIT - III

Random Processes – Temporal Characteristics: The Random Process Concept, Classification of Processes, Deterministic and Nondeterministic Processes, Distribution and Density Functions, concept of Stationarity and Statistical Independence. First-Order Stationary Processes, Second- Order and Wide-Sense Stationarity, (N-Order) and Strict-Sense Stationarity, Time Averages and Ergodicity, Mean- Ergodic Processes, Correlation-Ergodic Processes, Autocorrelation Function and Its Properties, Cross- Correlation Function and Its Properties, Covariance Functions, Gaussian Random Processes, Poisson Random Process. Random Signal Response of Linear Systems: System Response — Convolution, Mean and Mean-squared Value of System Response, autocorrelation Function of Response, Cross-Correlation Functions of Input and Output.

UNIT - IV

Random Processes – Spectral Characteristics: The Power Spectrum: Properties, Relationship between Power Spectrum and Autocorrelation Function, The Cross-Power Density Spectrum, Properties, Relationship between Cross-Power Spectrum and Cross-Correlation Function. Spectral Characteristics of System Response: Power Density Spectrum of Response, Cross-Power Density Spectrums of Input and Output.

UNIT - V

Noise Sources & Information Theory: Resistive/Thermal Noise Source, Arbitrary Noise Sources, Effective Noise Temperature, Noise equivalent bandwidth, Average Noise Figures, Average Noise Figure of cascaded networks, Narrow Band noise, Quadrature representation of narrow band noise & its properties. Entropy, Information rate, Source coding: Huffman coding, Shannon Fano coding, Mutual information, Channel capacity of discrete channel, Shannon-Hartley law; Trade -off between bandwidth and SNR.

TEXT BOOKS:

1. Peyton Z. Peebles - Probability, Random Variables & Random Signal Principles, 4th Ed, TMH, 2001.
2. Taub and Schilling - Principles of Communication systems, TMH, 2008

REFERENCE BOOKS:

1. Bruce Hajck - Random Processes for Engineers, Cambridge unipress, 2015
2. Athanasios Papoulis and S. Unnikrishna Pillai - Probability, Random Variables and Stochastic Processes, 4th Ed., PHI, 2002.
3. B.P. Lathi - Signals, Systems & Communications, B.S. Publications, 2003.
4. S.P Eugene Xavier -Statistical Theory of Communication, New Age Publications, 2003

M241AEC402: LINEAR AND DIGITAL INTEGRATED CIRCUITS APPLICATIONS

B.Tech. II Year II Sem.

L	T	P	C
3	0	0	3

Course Objectives: The main objectives of the course are:

1. To introduce the basic building blocks of linear integrated circuits.
2. To introduce the theory and applications of Analog multipliers and PLL.
3. To introduce the concept sine waveform generation and introduce some special function ICs.
4. To understand and implement the working of basic digital circuits.

Course Outcomes: Upon completing this course, the students will be able to

1. A thorough understanding of operational amplifiers with linear integrated circuits.
2. Attain the knowledge of functional diagrams and design applications of IC555 and IC565.
3. Acquire the knowledge and design the Data converters.
4. Choose the proper digital integrated circuits by knowing their characteristics.

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	1	-	-	-	-	-	-	-	-
CO2	3	3	3	1	-	-	-	-	-	-	-	-
CO3	3	3	3	1	-	-	-	-	-	-	-	-
CO4	3	3	2	1	-	-	-	-	-	-	-	-

UNIT - I

Operational Amplifier: Ideal and Practical Op-Amp, Op-Amp Characteristics, DC and AC Characteristics, Features of 741 Op-Amp, Modes of Operation-Inverting, Non-Inverting, Differential, Instrumentation Amplifier, AC Amplifier, Differentiators and Integrators, Comparators, Schmitt Trigger, Introduction to Voltage Regulators, Features of 723 Regulator, Three Terminal Voltage Regulators.

UNIT - II

Op-Amp, IC-555 & IC565 Applications: Introduction to Active Filters, Characteristics of Bandpass, Band reject and All Pass Filters, Waveform Generators — Triangular, Sawtooth, Square Wave, IC555 Timer-Functional Diagram, Monostable and Astable Operations, Applications, IC565 PLL-Block Schematic, principle and Applications.

UNIT - III

Data Converters: Introduction, Basic DAC techniques, Different types of DACs-Weighted resistor DAC, R-2R ladder DAC, Inverted R-2R DAC, Different Types of ADCs — Parallel Comparator Type ADC, Counter Type ADC, Successive Approximation ADC and Dual Slope ADC, DAC and ADC Specifications.

UNIT - IV

Combinational Logic ICs: Specifications and Applications of TTL-74XX & CMOS 40XX Series ICs - Code Converters, Decoders, LED & LCD Decoders with Drivers, Encoders, Priority Encoders, Multiplexers, Demultiplexers, Priority Generators/Checkers, Parallel Binary Adder/Subtractor, Magnitude Comparators.

UNIT - V

Sequential Logic IC's and Memories: Familiarity with commonly available 74XX & CMOS40XX Series ICs - All Types of Flip-flops, Synchronous Counters, Decade Counters, Shift Registers.

Memories – Memory organization and operation, expanding memory size, classification and characteristics of memories, sequential memory, read-only memory (ROM), ROM types, Read and write memory (RAM) types, Programmable logic array,

Programmable array logic, Field Programmable Gate Array (FPGA).

TEXT BOOKS:

1. Ramakanth A. Gayakwad - Op-Amps & Linear ICs, PHI, 2003.
2. Floydand Jain- Digital Fundamentals, 8th Ed., PearsonEducation,2005.

REFERENCE BOOKS:

1. D. Roy Chowdhury – Linear Integrated Circuits, New Age International(p)Ltd,2nd Ed., 2003.
2. John. F. Wakerly – Digital Design Principles and Practices, 3rdEd., Pearson, ,2009.
3. Salivahana -Linear Integrated Circuits and Applications, TMH, 2008.
4. William D.Stanley- Operational Amplifiers with Linear Integrated Circuits, 4thEd., PearsonEducation India, 2009.

M241AEC403: ELECTROMAGNETIC WAVES AND TRANSMISSION LINES

B.Tech. II Year II Sem.

L	T	P	C
3	0	0	4

Pre-requisite: Mathematics

Course Objectives: Upon completing this course, the students will be able to

1. To learn the Basic Laws, Concepts and proofs related to Electrostatic Fields and Magneto static Fields, and apply them to solve physics and engineering problems.
2. To distinguish between static and time-varying fields, and understand the significance and utility of Maxwell's Equations and Boundary Conditions, and gain ability to provide solutions to communication engineering problems.
3. To study the propagation, reflection and transmission of planewaves inbounded and unbounded media.

Course Outcomes: Upon completing this course, the student able to

1. Acquire the knowledge of Basic Laws, Concept sand proofs related to Electrostatic Fields and Magneto static Fields.
2. Characterize the static and time-varying fields, establish the corresponding sets of Maxwell's Equations and Boundary Conditions.
3. Analyze the Wave Equations and classify conductors, dielectrics and evaluate the UPW Characteristics for several practical media of interest.
4. Analyze the Design aspect of transmission line parameters and configurations.

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	1	-	1	-	-	-	1	-	-
CO2	3	3	2	1	-	1	-	-	-	1	-	-
CO3	3	3	2	1	-	1	-	-	-	1	-	-
CO4	3	3	2	1	-	1	-	-	-	1	-	-

UNIT – I

Electrostatics: Coulomb's Law, Electric Field Intensity – Fields due to Different Charge Distributions, Electric Flux Density, Gauss Law and Applications, Electric Potential, Relations Between E and V, Energy Density. Convection and Conduction Currents, Dielectric Constant, Isotropic and Homogeneous Dielectrics, Continuity Equation, Relaxation Time, Poisson's and Laplace's Equations, Capacitance – Parallel Plate, Coaxial, Spherical Capacitors.

UNIT – II

Magnetostatics: Biot-Savart's Law, Ampere's Circuital Law and Applications, Magnetic Flux Density, Magnetic Scalar and Vector Potentials, Forces due to Magnetic Fields, Ampere's Force Law.

UNIT – III

Maxwell's Equations (Time Varying Fields): Faraday's Law and Transformer EMF, Inconsistency of Ampere's Law and Displacement Current Density, Maxwell's Two Equations for Magnetostatic Fields, Maxwell's Two Equations for Electrostatic Fields Maxwell's Equations in Different Forms, Conditions at a Boundary Surface - Dielectric-Dielectric and Dielectric-Conductor Interfaces.

UNIT – IV

EM Wave Characteristics: Wave Equations for Conducting and Perfect Dielectric Media, Uniform Plane Waves — Definitions, Relation between E & H, Sinusoidal Variations, Wave Propagation in Lossless and Conducting Media, Conductors & Dielectrics – Characterization, Wave Propagation in Good Conductors and Good Dielectrics, Polarization.

Reflection and Refraction of Plane Waves – Normal and Oblique Incidences for both Perfect Conductor and Perfect Dielectrics, Brewster Angle, Critical Angle and Total Internal

Reflection, Surface Impedance, Poynting Vector and Poynting Theorem.

UNIT – V

Transmission Lines: Types, Parameters, Transmission Line Equations, Primary & Secondary Constants, Equivalent Circuit, Characteristic Impedance, Propagation Constant, Phase and Group Velocities, Infinite Line Concepts, Lossless / Low Loss Characterization, Condition for Distortion less line, Minimum Attenuation, Loading - Types of Loading.SC and OC Lines, λ/4, λ/2, λ/8 Lines, Reflection Coefficient, VSWR Smith Chart – Configuration and Applications, Single Stub Matching.

TEXT BOOKS:

1. William H. Hayt Jr. and John A. Buck- Engineering Electromagnetics, 8th Ed., McGraw Hill, 2014
2. Matthew N.O. sadiku and S.V. Kulkarni - Principles of Electromagnetics, 6th Ed., OxfordUniversity Press, Aisan Edition, 2015.

REFERENCE BOOKS:

1. JD. Kraus -Electromagnetics with Applications ,5th Ed., TMH
2. Umesh Sinha, Satya Prakashan -Transmission Lines and Networks, (Tech. India Publications), New Delhi, 2001.
3. JD Ryder -Networks, Lines and Fields, 2nd Ed., PHI, 1999

M241AEC404: ELECTRONIC CIRCUIT ANALYSIS

B.Tech. II Year II Sem. **L T P C**
3 0 0 3

Pre-requisite: Analog Circuits

Course Objectives: Upon completing this course, the student twill be able to

1. Learn the concepts of Power Amplifiers.
2. To give understanding of tuned amplifier circuits
3. Understand various multivibrators using transistors and sweep circuits.

Course Outcomes: Upon completing this course, the student will be able to

1. Design the power amplifiers
2. Design the tuned amplifiers and analyse is frequency response
3. Design Multivibrators and sweep circuits for various applications.
4. Utilize the concepts of synchronization, frequency division and sampling gates

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	1	-	3	2	-	-	-	-	1
CO2	3	3	3	1	-	2	2	-	-	-	-	1
CO3	3	3	3	1	-	2	2	-	-	-	-	1
CO4	3	3	3	1	-	3	2	-	-	-	-	1

UNIT – I

FET- Biasing Techniques

FET Amplifiers: Analysis of CS, CD, CG JFET Amplifiers, comparison of performance with BJT Amplifiers, Basic Concepts of MOSFET Amplifiers, MOS Small signal model, Common source amplifier with resistive, Diode connected and Current source loads, Source follower, Common Gate Stage, Cascode and Folded Cascode Amplifier – frequency response.

UNIT – II

Oscillators: Condition for Oscillations, RC type Oscillators-RC phase shift and Wien-bridge Oscillators, LC type Oscillators –Generalized analysis of LC Oscillators, Hartley and Colpitts Oscillators, Frequency and amplitude stability of Oscillators, Crystal Oscillator.

UNIT - III

Large Signal Amplifiers: Class A Power Amplifier- Series fed and Transformer coupled, Conversion Efficiency, Class B Power Amplifier- Push Pull and Complimentary Symmetry configurations, Conversion Efficiency, Principle of operation of Class AB and Class –C and D Amplifiers.

Tuned Amplifiers: Introduction, single Tuned Amplifiers – Q-factor, frequency response, Double Tuned Amplifiers – Q-factor, frequency response, Concept of stagger tuning and synchronous tuning

UNIT - IV

Time Base Generators: General features of a Time base Signal, Methods of Generating Time Base Waveform, concepts of Transistor Miller and Bootstrap Time Base Generator, Methods of Linearity improvement.

UNIT - V

Synchronization and Frequency Division: Pulse Synchronization of Relaxation Devices, Frequency division in Sweep Circuits, Stability of Relaxation Devices, Astable Relaxation Circuits, Monostable Relaxation Circuits, Synchronization of a

Sweep Circuit with Symmetrical Signals, Sine wave frequency division with a Sweep Circuit, A Sinusoidal Divider using Regeneration and Modulation.

Sampling Gates: Basic operating principles of Sampling Gates, Unidirectional and Bi-directional Sampling Gates, Four Diode Sampling Gate, Reduction of pedestal in Gate Circuits

TEXT BOOKS:

1. Jacob Millman, Christos C Halkias - Integrated Electronics, , McGraw Hill Education.
2. J. Millman, H. Taub and Mothiki S. PrakashRao - Pulse, Digital and Switching Waveforms –2nd Ed., TMH, 2008,

REFERENCE BOOKS:

1. David A. Bell - Electronic Devices and Circuits, 5th Ed., Oxford.
2. Robert L. Boylestead, Louis Nashelsky - Electronic Devices and Circuits theory, 11th Ed.,Pearson, 2009
3. Ronald J. Tocci - Fundamentals of Pulse and Digital Circuits, 3rd Ed., 2008.
David A. Bell - Pulse, Switching and Digital Circuits, 5th Ed., Oxford, 2015

M241AEC405: ANALOG AND DIGITAL COMMUNICATIONS

B.Tech. II Year II Semester **L T P C**
3 0 0 3

Prerequisite: Signal and systems

Course Objectives:

1. To develop ability to analyze system requirements of Analog and digital communication systems.
2. To understand the generation, detection of various Analog and digital modulation techniques.
3. To acquire the vortical knowledge of each block in AM, FM transmitters and receivers.
4. To understand the concepts of baseband transmissions.

Course Outcomes: Upon completing this course, the student able to

1. Design and analyze various Analog and Digital Modulation and Demodulation techniques.
2. Model the noise present in continuous wave Modulation techniques.
3. Implement the Super heterodyne Receiver concept and Pulse Modulation Techniques in various applications
4. Analyze and design the base band Transmission

Course	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	3	3	3	1	-	3	2	-	-	-	-	1	2	2
CO2	3	3	3	1	-	2	2	-	-	-	-	1	2	2
CO3	3	3	3	1	-	2	2	-	-	-	-	1	2	2
CO4	3	3	3	1	-	3	2	-	-	-	-	1	2	2

UNIT - I

Amplitude Modulation: Need for modulation, Amplitude Modulation - Time and frequency domain description, single tone modulation, power relations in AM waves, Generation of AM waves - Switching modulator, Detection of AM Waves - Envelope detector, DSBSC modulation - time and frequency domain description, Generation of DSBSC Waves - Balanced Modulators, Coherent detection of DSB-SC Modulated waves, SSB modulation - time and frequency domain description, frequency discrimination and Phase discrimination methods for generating SSB, Demodulation of SSB Waves, principle of Vestigial side band modulation.

UNIT - II

Angle Modulation: Basic concepts of Phase Modulation, Frequency Modulation: Single tone frequency modulation, Spectrum Analysis of Sinusoidal FM Wave using Bessel functions, Narrow band FM, Wide band FM, Constant Average Power, Transmission bandwidth of FM Wave - Generation of FM Signal- Armstrong Method, Detection of FM Signal: Balanced slope detector, Phase locked loop, Comparison of FM and AM., Concept of Pre-emphasis and de-emphasis.

UNIT - III

Transmitters: Classification of Transmitters, AM Transmitters, FM Transmitters

Receivers: Radio Receiver - Receiver Types - Tuned radio frequency receiver, Super heterodyne receiver, RF section and Characteristics - Frequency changing

and tracking, Intermediate frequency, Image frequency, AGC, Amplitude limiting, FM Receiver, Comparison of AM and FM Receivers.

UNIT - IV

Pulse Modulation: Types of Pulse modulation- PAM, PWM and PPM. Comparison of FDM and TDM.

Pulse Code Modulation: PCM Generation and Reconstruction, Quantization Noise, Non-Uniform Quantization and Companding, DPCM, Adaptive DPCM, DM and Adaptive DM, Noise in PCM and DM.

UNIT - V

Digital Modulation Techniques: ASK- Modulator, Coherent ASK Detector, FSK- Modulator, Non- Coherent FSK Detector, BPSK- Modulator, Coherent BPSK Detection. Principles of QPSK, Differential PSK and QAM.

Baseband Transmission and Optimal Reception of Digital Signal: A Baseband Signal Receiver, Probability of Error, Optimum Receiver, Coherent Reception, ISI, Eye Diagrams.

TEXT BOOKS

1. Simon Haykin -Analog and Digital Communications, John Wiley, 2005.
2. Wayne Tomasi - Electronics Communication Systems-Fundamentals through Advanced, 5th Ed., PHI, 2009.

REFERENCE BOOKS

1. Herbert Taub, Donald L Schilling, Goutam Saha, -Principles of Communication Systems, 3rd Ed., McGraw-Hill, 2008.
2. Dennis Roddy and John Coolean - Electronic Communications, 4th Ed., PEA, 2004
3. George Kennedy and Bernard Davis - Electronics & Communication System, TMH, 2004
4. K. Sam Shanmugam - Analog and Digital Communication, Willey, 2005

M241AEC406: LINEAR AND DIGITAL INTEGRATED CIRCUITS APPLICATIONS LABORATORY

B.Tech. II Year II Semester

L	T	P	C
0	0	2	1

Course Outcomes: Upon completing this course, the student able to

1. Design and implementation of various analog circuits using 741 ICs.
2. Design and implementation of various Multivibrators using 555 timer.
3. Design and implement various circuits using digital ICs.
4. Design and implement ADC, DAC and voltage regulators.

Note:

- Minimum 12 experiments should be conducted.
- Verify the functionality of the IC in the given application.

Design and Implementation of:

1. Design an Inverting and Non-inverting Amplifier using Op Amp and calculate gain.
2. Design Adder and Subtractor using Op Amp and verify addition and subtraction process.
3. Design a Comparator using Op Amp and draw the comparison results of A=B, A<B, A>B.
4. Design a Integrator and Differentiator Circuits using IC741 and derive the required condition practically.
5. Design a Circuit using IC741 to generate sine/square/triangular wave with period of 1KHZ and draw the output waveform.
6. Construct Mono-stableMultivibratorusingIC555 and draw its output waveform.
7. Construct Astable Multivibrator using IC555 and draw its output waveform and also find its duty cycle.
8. Design a Schmitt Trigger Circuit and find its LTP and UTP.
9. Design Voltage Regulator using IC723, IC 7805/7809/7912 and find its load regulation factor.
10. Design R-2R ladder DAC and find its resolution and write a truth table with respective voltages.
11. Design a Gray code converter and verify its truth table.
12. Design a 8x1 multiplexer using digital ICs.
13. Design a 4-bit Adder/Subtractor using digital ICs and Add/Sub the following bits. (i)1010 (ii)0101 (iii)1011
    0100 0010 1001.
14. Design a Decade counter and verify its truth table and draw respective waveforms.
15. Design a Up/down counter usingIC74163 and draw read/write waveforms.
16. Design a Universal shift register using IC 74194/195 and verify its shifting operation.
17. Design a 8x3 encoder/3x8 decoder and verify its truth table.

Major Equipment required for Laboratories:

1. 5 V Fixed Regulated Power Supply/ 0-5V or more Regulated Power Supply; Multimeter
2. 20 MHz Oscilloscope with Dual Channel; Bread board and components/Trainer Kit;

M241AEC407: ELECTRONIC CIRCUIT ANALYSIS LABORATORY

B.Tech. II Year II Sem. **L T P C**
0 0 2 1

Note:
- Experiments have to be designed, simulated.
- Minimum of 12 experiments.

Course Outcomes: Upon completing this course, the students will be able to
1. Design power amplifiers and find its efficiency
2. Design tuned amplifiers and find its Q-factor
3. Design various multivibrators and sweep circuits. Understand the necessity of linearity
4. Design sampling gates and understanding the concepts of frequency division

Software Testing in Laboratory:
1. Design transformer coupled class A power amplifier and draw the input and output waveformsfind its efficiency.
2. Design class B power amplifier and draw the input and output waveforms.
3. Design complementary symmetry pushpull amplifier input and output waveforms
4. Design class C power amplifier and draw the input and output waveforms.
5. Design a single tuned amplifier.
6. Design a Bistable Multivibrator and draw the input and output waveforms.
7. Design an Astable Multivibrator and draw the wave forms at base and collector oftransistors.
8. Design a Monostable Multivibrator and draw the input and output waveforms.
9. Design a Bootstrap sweep circuit using BJT and draw its output time base waveform
10. Design a Miller sweep circuit using BJT and draw its output time base waveform.
11. Design a constant current sweep generator and draw input and output waveforms.
12. Design unidirectional and bidirectional sampling gates.
13. Design Schmitt Trigger generates square wave.
14. Frequency division with sweep circuit.

Major Equipment required for Laboratories:
1. Computer System with latest specifications connected
2. Window XP or equivalent
3. Simulation software-Multisim or any equivalent simulation software

M241AEC408: ANALOG AND DIGITAL COMMUNICATIONS LAB

B.Tech. II Year II Sem.

L	T	P	C
0	0	2	1

Note:

- Minimum 12 experiments should be conducted:
- All these experiments are to be simulated first either using MATLAB or any other simulation package

Course Outcomes: Upon completing this course, the student able to:

1. Design and implement various Analog modulation and demodulation Techniques and observe the time and frequency domain characteristics
2. Design and implement various Pulse modulation and demodulation Techniques and observe the time and frequency domain characteristics
3. Apply different types of Sampling with various Sampling rates and duty Cycles
4. Design and implement various Digital modulation and demodulation Techniques and observe the waveforms of these modulated Signals practically

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	-	3	1	2	2	-	2	3	2	-	1
CO2	1	-	3	1	2	2	-	2	3	2	-	1
CO3	1	-	3	1	2	2	-	2	3	2	-	1
CO4	1	-	3	1	2	2	-	2	3	2	-	1

List of Experiments: (Twelve experiments to be done)

1. Amplitude modulation and demodulation
2. Frequency modulation and demodulation
3. DSB-SC Modulator & Detector
4. SSB-SC Modulator & Detector
5. Frequency Division Multiplexing & De multiplexing
6. Pulse Amplitude Modulation & Demodulation
7. Pulse Width Modulation & Demodulation
8. Pulse Position Modulation & Demodulation
9. PCM Generation and Detection
10. Delta Modulation
11. DPCM Generation and Detection
12. Frequency Shift Keying Generation and Detection
13. Binary Phase Shift Keying Generation and Detection
14. Generation and Detection DPSK
15. Generate and Detection QPSK

Major Equipment required for Laboratories:

1. MAT Lab/Equivalent Simulation Package with Communication tool box

*M241AEC409: GENDER SENSITIZATION LAB

B.Tech. II Year II Sem. **L T P C**

0 0 3 0

COURSE DESCRIPTION

This course offers an introduction to Gender Studies, an interdisciplinary field that asks critical questions about the meanings of sex and gender in society. The primary goal of this course is to familiarize students with key issues, questions and debates in Gender Studies, both historical and contemporary. It draws on multiple disciplines — such as literature, history, economics, psychology, sociology, philosophy, political science, anthropology and media studies – to examine cultural assumptions about sex, gender, and sexuality.

This course integrates analysis of current events through student presentations, aiming to increase awareness of contemporary and historical experiences of women, and of the multiple ways that sex and gender interact with race, class, caste, nationality and other social identities. This course also seeks to build an understanding and initiate and strengthen programmes combating gender-based violence and discrimination. The course also features several exercises and reflective activities designed to examine the concepts of gender, gender-based violence, sexuality, and rights. It will further explore the impact of gender-based violence on education, health and development.

Objectives of the Course

- To develop students' sensibility with regard to issues of gender in contemporary India.
- To provide a critical perspective on the socialization of men and women.
- To introduce students to information about some key biological aspects of genders.
- To expose the students to debates on the politics and economics of work.
- To help students reflect critically on gender violence.
- To expose students to more egalitarian interactions between men and women.

Learning Outcomes

- Students will have developed a better understanding of important issues related to gender in contemporary India.
- Students will be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and film.
- Students will attain a finer grasp of how gender discrimination works in our society and how to counter it.
- Students will acquire insight into the gendered division of labor and its relation to politics and economics.
- Men and women students and professionals will be better equipped to work and live together as equals.
- Students will develop a sense of appreciation of women in all walks of life.
- Through providing accounts of studies and movements as well as the new laws that provide protection and relief to women, the textbook will empower students to understand and respond to gender violence.

Unit-I: UNDERSTANDING GENDER

Introduction: Definition of Gender-Basic Gender Concepts and Terminology-Exploring Attitudes towards Gender-Construction of Gender-Socialization: Making Women, Making Men

- Preparing for Womanhood. Growing up Male. First lessons in Caste.

Unit – II: GENDER ROLES AND RELATIONS

Two or Many? -Struggles with Discrimination-Gender Roles and Relations-Types of Gender Roles- Gender Roles and Relationships Matrix-Missing Women-Sex Selection and Its Consequences- Declining Sex Ratio. Demographic Consequences-Gender Spectrum: Beyond the Binary

Unit – III: GENDER AND LABOUR

Division and Valuation of Labour-Housework: The Invisible Labor- "My Mother doesn't Work." "Share the Load."-Work: Its Politics and Economics -Fact and Fiction. Unrecognized and Unaccounted work.

-Gender Development Issues-Gender, Governance and Sustainable Development-Gender and Human Rights-Gender and Mainstreaming

Unit – IV: GENDER - BASED VIOLENCE

The Concept of Violence- Types of Gender-based Violence-Gender-based Violence from a Human Rights Perspective-Sexual Harassment: Say No!-Sexual Harassment, not Eve-teasing- Coping with Everyday Harassment- Further Reading: "*Chupulu".*Domestic Violence: Speaking OutIs Home a Safe Place? -When Women Unite [Film]. Rebuilding Lives. Thinking about Sexual Violence Blaming the Victim-"I Fought for my Life…."

Unit – V: GENDER AND CULTURE

Gender and Film-Gender and Electronic Media-Gender and Advertisement-Gender and Popular Literature- Gender Development Issues-Gender Issues-Gender Sensitive Language-Gender and Popular Literature - Just Relationships: Being Together as Equals

Mary Kom and Onler. Love and Acid just do not Mix. Love Letters. Mothers and Fathers. Rosa Parks-The Brave Heart.

Note: Since it is Interdisciplinary Course, Resource Persons can be drawn from the fields of English Literature or Sociology or Political Science or any other qualified faculty who has expertise in this field from engineering departments.

- Classes will consist of a combination of activities: dialogue-based lectures, discussions, collaborative learning activities, group work and in-class assignments. Apart from the above prescribed book, Teachers can make use of any authentic materials related to the topics given in the syllabus on "Gender".

ESSENTIAL READING: The Textbook, "*Towards a World of Equals: A Bilingual Textbook on Gender"* written by A.Suneetha, Uma Bhrugubanda, DuggiralaVasanta, Rama Melkote,

Vasudha Nagaraj, Asma Rasheed, Gogu Shyamala, Deepa Sreenivas and Susie Tharu published by Telugu Akademi, Telangana Government in 2015.

ASSESSMENT AND GRADING:

- Discussion & Classroom Participation: 20%
- Project/Assignment: 30%

- End Term Exam: 50%